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Dentists' knowledge, skills, and application of behavior guidance techniques on adults with dental fear and anxiety

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DENTISTS' KNOWLEDGE, SKILLS, AND APPLICATION OF BEHAVIOR GUIDANCE

TECHNIQUES ON ADULTS WITH DENTAL FEAR & ANXIETY

SARAH C. MORIARTY, D.D.S.

A Thesis Presented to the Faculty of the College of Dental Medicine of Nova

Southeastern University in Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

July 2015

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By

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Department of Pediatric Dentistry

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I certify that I am the sole author of this thesis, and that any assistance I received in its preparation has be fully acknowledged and disclosed in the thesis. I have cited any sources from which I used ideas, data, or words, and labeled as quotations any directly quoted phrases or passages, as well as providing proper documentation and citations. This thesis was prepared by me, specifically for the M.S. degree and for this assignment.

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DEDICATION

To all of the educators who selflessly teach with passion… your lessons leave the

greatest imprints on your students' lives. We are forever grateful.

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I would like to acknowledge all of my committee members for their continuous

dedication and support throughout this process. This is was one of the few times in

life that I can truly state that I would not have been able to succeed on my own.

Thank you.

ABSTRACT

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TECHNIQUES ON ADULTS WITH DENTAL FEAR & ANXIETY

JULY 2015

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Goals and objectives. To gather information intended to advocate for increased
behavioral sciences integration into dentistry that could directly benefit the
pediatric population by easing transitions to other dental specialists or into adult
dental care. Furthermore, to facilitate the potential indirect effect of vertical
transmission reduction through fearful adults pursuing dental care. **Background.**
Extensive detail is provided regarding; the negative effects of DFA on the patient
and practitioner, deficits in the literature on the topic, identification and
management of different types of fear, and detailed behavior guidance techniques
applicable to the adult population. **Methods.** A 28-question survey instrument was
designed and sent to 6,117 ADA members in the United States via a medical
marketing agency regarding attitudes and beliefs of dentists on behavior guidance
techniques practiced on adults. Frequencies and one-tailed z-proportion tests were
used to investigate dentists' skills in treating dental fear and anxiety in adult

patients, current strategies used in practice to treat these patients, and explore the
need for additional education. **Results.** A total of 234 people responded to the
survey; of which, 162 responses qualified for analysis. Overall, the majority of
dental practitioners perceive that they understand the conceptual framework of
techniques and can effectively apply them; yet, most experience stress, difficulty,
and have very limited educational background in behavior guidance. There was an
interest in learning the correct application of techniques, but unwillingness to pay
for education that could teach such skills. The results of the analysis enable
acceptance of the alternative hypothesis for portions of every aim. **Conclusion.** In
relation to the study group, with very limited DFA knowledge, dentists are apt to be
blinded to the potential understanding, application, and success that can come with
behavior guidance education and integration into the dental field. This conclusion
was supported by the contradictory answers provided by survey participants.
Sufficient information was gathered to validate that a need exists to advocate for
increased behavioral sciences integration into dentistry. With limited modern
literature this study implies a need to invest into well-designed studies to prove a
behavior guidance deficit exists in the U.S. dentist population, in addition to benefits
that accompany a knowledgeable provider.

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GLOSSARY

Behavior Guidance: A clinical art form and skill built on a foundation of scientific

principles, that requires communication, empathy, coaching, tolerance,

flexibility, and active listening; the goal is to establish communication,

alleviate DFA, deliver quality care, building a trusting relationship, and

promote a positive attitude towards oral health [1].

Behavior Shaping: A direct intentional response (by dentist) immediately

following a behavior (patient) to positively or negatively reinforce that

behavior, this includes verbal acknowledgement of cooperation or

complimenting patient for progress [2].

Communication: Establishment of an effective two-way interaction that

acknowledges patient's verbal and non-verbal cues while demonstrating

empathy and providing information to correct anticipatory

misconceptions [2,3].

Contingent Escape: A brief break (5 seconds - 1 minute) of escape contingent upon

cooperative behavior (or completing a task), with any disruptive behavior

delaying the break [4,5].

Control: Enables a patient to feel that they can regulate the situation if need be; this

increase in predictability results in a decrease in uncertainty [3].

Coping Strategies: A cognitive process with dynamic changes over time in

response to objective demands and subjective appraisal of the situation [6,7].

Dental Anxiety: Denotes a state of apprehension that something dreadful is going to happen in relation to dental treatment, and is coupled with a sense of loosing control [8].

Dental Fear: A normal emotional reaction to one or more specific threatening stimuli in the dental setting [8].

Dental Fear & Anxiety: A complex combination of exogenous and endogenous factors that result in strong negative feelings associated with dental treatment [6,8].

Diaphragmatic Breathing: A taught form of slowly paced abdominal breathing to induce a physiological relaxation response [3].

Distraction: Directing a shift in attention or mental focus to a specific alternative stimuli or situation [3].

Guided Imagery: A taught technique that involves patients mentally taking themselves to a pleasant or relaxing place [3].

Hypnosis: An interactive process where the hypnotist attempts to influence a patient's perceptions, feeling, thinking, and behavior by asking to concentrate on ideas and images to evoke the intended effect [3].

Intensive Cognitive Therapy: Aims to analyze a patient's thoughts, beliefs, interpretations, and how they interact with emotions [9].

Interim Therapeutic Restoration (ITR): a procedure in which only soft, demineralized tooth tissue is removed with hand instruments alone followed by placement of an adhesive restoration such as glass ionomer [1].

Internal Locus of Control: Individuals that generally believe that they, rather than other people, uncontrollable factors, or fate, are responsible for the outcome of their lives [10].

Mild Cognitive Therapy: Aims to facilitate a new understanding and restructure a patient's mind to no longer fear a specific stimulus [9].

Non-Verbal Communication: Reinforcement and guidance of behavior through appropriate contact, posture, facial expression, and body language [1].

Progressive Muscle Relaxation: A taught systematically guided tensing and relaxation of muscles to induce a physiological relaxation response [3].

Signaling: A predetermined signal established between provider and patient that allows the patient to halt any procedure [3].

Social Modeling: Observation of another person undergoing similar dental treatment to foster adaptive behavior through vicarious conditioning (observation and imitation) [11] [5] [12].

Successive Approximation: Slowly exposing a patient to a more invasive procedure while allowing them to maintain a sense of control, this includes things like running handpiece with a bur next to a tooth, then slightly touching the tooth, and then finally on the tooth to acclimate the patient [2].

Systematic Desensitization: Slowly exposing a patient to a more invasive procedure while allowing them to maintain a sense of control [13].

Tell-Show-Do: A technique that requires steps: an age (developmentally) appropriate verbal explanation of a procedure, followed by a demonstration that engages as many senses as possible (visual, auditory, olfactory, and tactile), then completion of the procedure without deviating from the established plan [1,5].

Chapter 1: Introduction

1.1: Topic Overview

1.1.1: Topic Introduction/Premise

Pediatric dentists apply the clinical art form and skill of behavior guidance [1] on every patient by implementing, "communication, empathy, coaching, tolerance, flexibility, and active listening" [1], in efforts to establish effective "communication, alleviate fear and anxiety, deliver quality dental care, build a trusting relationship, and promote the child's positive attitude toward oral health care" [1]. This requires critically assessing the effects of a treatment approach on a specific patient, with immediate modification if necessary [8], and has been shown to have positive effects on behavior at subsequent appointments [14]. Behavior guidance techniques are strong and well established in the dental literature with trends in use being more heavily influenced by societal acceptance rather than clinical effectiveness [15].

Pediatric dental research and education should work towards establishing a behavior guidance foundation for the practitioner who sees adult patients to enable them to fully understand and apply techniques comfortably in a routine practice setting. It is the principle investigators belief that most pediatric behavior guidance principles can and should be used in adult patients, but exposure on how to use these techniques are limited and almost always reserved for the pediatric patient without regards to how to adjust language and actions to properly communicate with the adolescent or adult patient. Expanding knowledge to disciplines outside of

pediatric dentistry would aid in treatment of the adult population and also of the pediatric population when seeking treatment from these other providers.

1.1.2: Background and Justification

According to Brahm et al. dental fear is recognized as one of the most common fears and phobias and is considered a universal problem; yet, there is scarce literature in regards to dentist's competence in dental fear and current treatment strategies for treating adult patients who are affected [16].

Despite the literary support for dentists to screen for dental anxiety [17], a recent Australian study found that only 3.7% of dentists use validated dental anxiety screening scales with the majority of participants reporting that they were unaware such scales existed [18]. In this same study, 66.9% of dentists reported that they had not received any formal training in dental school on the identification and management of DFA despite the predicted prevalence of 19.4% of adults in the Australian population [18].

1.1.3: Research Problem

Historically, dental literature recognizes the challenge of working with adult patients identified with DFA [19], and the behavioral sciences have reciprocated by developing numerous scales to accurately measure dental anxiety [17]. Modern American dental literature has failed to establish treatment guidelines for adult patients with DFA that utilize psychological constructs to demonstrate how

behavioral guidance can ameliorate this challenge. Most of the literature on this

topic is in International journals and limited studies address the dentists'

competence in treating DFA adults [16].

1.1.4: Deficiencies in the Evidence

Similar to the education provided to the pediatric dentist on behavior

guidance, literature and educational courses need to support behavior guidance of

the adult patient for the general practitioner. Just as pediatric behavior guidance is

second nature to the pediatric practitioner, adult behavior guidance should be

second nature to any adult practitioner. There is an overwhelming amount of

literature supporting pediatric behavior guidance techniques; describing how they

are defined, how they should be implicated, indication, contraindication, benefits,

risks, degree of effectiveness in which situation, and such forth, is incomparable to

the literature on adult behavior guidance techniques. In order to formulate a

thorough literature review for this study, the principle investigator had to include

behavior guidance concepts from the pediatric dental literature (only concepts that

are not pediatric-specific were included), access international studies, and use dated

literature that could only be found in print. If the review had been limited to

modern American dental literature specific for adult patients, there would have

been insufficient evidence to support the research question. This deficit does not

support the ideal that general practitioners are practicing evidence-based behavior

guidance on adult patients based on the dental literature.

1.1.5: Audience

This study will benefit the dental practitioners, dental educators, and all associated patients. The act of simply reading the survey instrument itself may spark the in interest of some dentists; leading to a self-driven investigation of the topic, which could result in a direct benefit of dentist's awareness, motivation to increase knowledge, and application in practice that could increase patient satisfaction. Outside of this immediate benefit, this study will act as the first step towards advocating for increased behavior science integration into dental curriculum and continuing education courses.

Accomplishing this momentous task could lead to a drive in education to hire experts who can efficiently and effectively teach behavior sciences in a manner that can be directly applied to the dental office, which would increase awareness, drive further research, and equip most practitioners with new skill that will become part of the dental profession. It could also potentially increase dentist satisfaction; pertaining to, satisfaction with ability to efficiently treat DFA patients, increased ability to recognize critical signals in DFA patients, decreased patient cancellations, less stress, and running a more efficient practice. It may also equip practitioners outside of pediatric dentists to more appropriately manage pediatric patients or patients with special health care needs when needed (i.e. for treatment outside the scope of pediatric dentistry or transitioning patients to age appropriate providers). Most importantly, all associated patients will benefit from a more tolerable, less threatening, empathetic dental environment; which could result in, increased

patient satisfaction, more consistent preventative measures with decreased

extensive procedures, with parents less likely to indirectly influence their children

to develop DFA or directly enabling transmission of oral bacteria that will have a

lifelong effect on their oral cavity.

<u>1.1.6: Purpose of the Study</u>

The purpose of this specific study is to investigate the dentists' skills in

treating dental fear and anxiety (DFA) in adult patients, current strategies used in

practice to treat these patients, and to explore the need for additional education. It

is intended to gather information that may be used to advocate for increased

behavioral sciences integration into dentistry that could directly benefit the

pediatric population by easing transition to other dental specialists or into adult

dental care and reducing vertical transmission from caregivers.

1.2: Dental Fear and Anxiety (DFA) and Dental Office Management

Dental fear and anxiety (DFA) is prominent amongst the adult population [9],

and it is considered the main cause of dental avoidance [6,20-22]. Avoidance of dental

care leads to deterioration of oral health [20], which can severely impact a person's

psychosocial function and quality of life [9,20,23]. Feelings of guilt, shame, and

inferiority ensue with dentition deterioration, resulting in more fear and anxiety,

leading back to avoidance of dental care in a cyclic pattern [23,24]. DFA is similar to

specific phobias since it involves pronounced avoidance tendencies and interferes in

multiple ways with the afflicted person's life [23]. It is a combination of exogenous

factors (direct or indirect learning form aversive experiences) and endogenous factors (part of general anxiety/depressive disorder) [6]. Previous studies have reported that 75% of U.S adults experience some degree of DFA; with 5-10% avoiding treatment all together with the exception of severe pain or oral pathology [25]. This delay in care leads to more extensive treatment needs [9]. The invasive procedures usually required to treat a patient's dental emergency negatively reinforces their DFA, feeding into the same cyclic pattern[25].

Traditionally, dental avoiders originate from one of two groups, either those with family members who had unpleasant dental experiences or poor attitudes towards dentists, or those who had an early traumatic experience themselves [19]. Publications in the 1920s are reported to caution dentists about the need to minimize DFA in the dental office by using techniques such as positive suggestions and being aware of their actions [19].

To the dentist's disadvantage, visiting the dentist can elicit acute anxiety and fear not only in patients with previous negative experiences, but also those who have not necessarily had a positive experience [26]. Unlike young children, adults are bound by social convention to behave in the dental office [26]; this absence of negative behaviors can mask the emotional needs of the patient. Which implies that completing a dental procedure on an adult patient with DFA should not be considered a success in itself, especially when 70% of patients with DFA regularly attend their dental visits despite their anxiety [6]. As dental professionals it is

important to care for the wellbeing of patients, and enable coping skills to improve future outcomes. Practitioners should frequently apply behavior guidance techniques [27] with the intension of preventing developing fear and possibly curing patients who manifest with DFA [28].

Regardless DFA severity, treatment may challenge both the patient and the dental healthcare team [9,16,17,29]. This challenge can arise from stress reactions intraoperative when patients complain excessively [16,21,28], move during treatment, are problematic [16,21,28], and directly impact treatment performed [9]; or outside the operatory when the patient delays scheduling preventive or conservative treatment [9], cancels last minute or misses appointments all together [9,16,21,29]; resulting in anger, irritation , and frustration [28] with patients labeled as time-consuming and unprofitable [16,21,28]. After leaving the dental office these patients can pose an increased inherent malpractice risk since highly anxious patients are less likely to recall information given by their provider, tend to see their dentist as less technically competent, and are less satisfied with overall treatment than patients with low anxiety [30]. This can create a problem during the treatment planning phase and become a true practice management risk if consent needs to be obtained for a change in treatment amidst a procedure.

Of 1,293 dentists surveyed in Sweden in 2009, 80% felt that DFA patients were problematic during routine dental care [28]. Even though dentists associated these patients with hard work, poor revenues, and little appreciation by their

employer (for serving this population), most dentists viewed it as a positive challenge, contribution to society, and a time investment for their future practice [28]. This particular study also revealed that dentists with lower self-efficacy in treating these patients experienced higher stress themselves, had negative attitudes toward this population, and were reluctant to treat them [28]. This type of dentist could potentially cause more harm than good when treating DFA patients [28].

There is a common theme in the dental literature in relation to dentists' interactions with DFA patients and their former training. Dentists with dental training on DFA addressed patients' fear and anxiety earlier, to a greater extent, more often, with less difficulty, had increased patient compliance (returning for appointments), and desired additional training [16,27,28,31,32]. While dentists with a lack of (or perceived lack of) DFA training reported higher stress, more difficulty, more discomfort, had inadequate confidence in using techniques, and also desired more training [27,28,32]. Both of these groups are diverse with the exception of a uniform desire to have increased training in dental fear and anxiety patient management.

The ability for the dentist to cope and accommodate this population has become increasingly more important over time as dentistry has shifted to a business where the dentist must market their office, offered procedures, and interpersonal skills to compete for business [21]. Weiner et al identified a very important aspect of interpersonal skills in dentistry as the understanding and management of dental

anxiety [21]. Despite previous reports that dentists lacked self-efficacy in understanding the psychological constructs of behavior guidance and proper management, there has not been a dramatic change in CE courses offered to enhance skills in behavior guidance for adult patients [21]. To make matters more difficult, the ADA guidelines established for training in anxiety and behavior control [21] that is referred to in dated literature either no longer exists or is very difficult to locate.

Increased frequency of CE (continuing education) or having specialty training has been correlated with dentists using a broader array of techniques and having less difficulty treating these patients [27,33]. It has also been shown that dentists with additional training on guidance of DFA desired more training [16]. This implicates that either dentists who are already interested in treating patients with DFA desire additional education, or those without a basic DFA education are ignorant of what could be learned and easily applied.

While establishing and offering DFA management continuing education courses would be considered an immense success, it is unlikely that these courses would influence the profession without concurrent integration of behavior guidance into the dental schools. Previous literature distinguishes a pattern of those who are educated in behavior science during dental school are more likely to address patients' DFA, feel more comfortable treating patients with DFA, and desire to

further their education in this field [16,21]. Therefore, if we do not provide a

meaningful scaffold in behavior guidance for dental students, we cannot anticipate

they will seek further education in this field.

As previously mentioned, dental literature recognizes the challenge of

working with adult patients identified with DFA [19], as a result the behavioral

sciences have reciprocated by development of numerous scales to accurately

measure dental anxiety [17]; with Corah's Dental Anxiety scale was found to be the

most widely used and the best to evaluate adult anxiety in the dental clinic [17].

Modern US dental literature acknowledges DFA in the adult population, but focuses

on the need to provide pharmacologic intervention, such as sedation, in the average

dental office [25]. Additionally, it has failed to integrate non-pharmacological

treatment guidelines for adult patients with DFA into everyday practice, limiting the

knowledge of how to utilize DFA psychological constructs to demonstrate how

behavioral guidance can ameliorate this challenge. Not surprisingly, the impact of

evidence-based psychological factors on dental treatments has not been translated

into dental practice [27], despite clinical studies proving psychotherapy (such as

relaxation) to be highly effective in reducing DFA [27].

1.3: Behavior Guidance

Pediatric dentists apply the clinical art form and skill of behavior guidance [1]

on every patient by implementing, "communication, empathy, coaching, tolerance,

flexibility, and active listening" [1], in efforts to establish effective "communication,

alleviate fear and anxiety, deliver quality dental care, build a trusting relationship, and promote the child's positive attitude toward oral health care" [1]. This requires critically assessing the effects of a treatment approach on a specific patient, with immediate modification if necessary [8], and has been shown to have positive effects on behavior at subsequent appointments [14]. Behavior guidance techniques are derived from validated principles in psychology [34] and are strong and well established in the dental literature with trends in use being more heavily influenced by societal acceptance rather than clinical effectiveness [15].

Techniques to manage dental fear and anxiety (DFA) in both adult and pediatric populations appear in archived dental literature [19,35]. Yet, modern literature has shifted to focus almost exclusively behavior guidance of pediatric population. Emergence of advanced pharmacological techniques and training appears to have replaced non-pharmacological techniques as a routine treatment option in adult patients with DFA [25]. This is unfortunate since most pharmacological techniques assume an immense risk in comparison to non-pharmacological techniques, and are viewed as less acceptable to DFA patients and the general public when provided the option of psychological techniques [9]. They remove control from the patients and interfere with learning coping skills to decrease DFA [19]. Behavior guidance techniques for adults aim to create trust and control for the patient, with the benefit of a more predictive environment for dental staff [16].

Application of behavior guidance techniques is appropriate for all patients, keeping in mind that the majority of patients experience anxiety in relation to dental treatment [25]. DFA encompasses those patients who are mildly anxious, so the dental team needs to be able to assess those patients without obvious phobic signs and symptoms in order to intervene appropriately [9]. Brahm et al describes behavior guidance techniques as the following: (1) Psychological, which creates trust and control during treatment; (2) pharmacological, aids to decrease stress; (3) coping strategies, are taught techniques to reduce anxiety (distraction, relaxation, hypnosis); and (4) behavior treatment, to reduce fear by gradual exposure in a systematic way [16]. Behavior treatment has been shown to be more effective in reducing DFA when compared to general anesthesia with the additional benefit of long-term outcomes; a follow-up study conducted one decade after the initial intervention study showed lasting DFA reduction on the behavior treatment group [16].

One of the goals in behavior guidance techniques is to trigger a relaxation response in the body. This consists of slowing respiratory rate, heart rate, and blood pressure, resulting in vasodilation and sense of calmness [3]. Calmness should be equated with the "rest and digest" phase of physiology as opposed to the "fight or flight" stage. This stage allows a patient to logically think, reason, and listen to what the dental team is trying to communicate. If the patient does not at least progress towards this stage during an appointment DFA will not be alleviated and compliance may become an issue.

Another major goal is to teach coping strategies to maladaptive patients that have a tendency towards catastrophic idealization, praying, or feelings of despair when experiencing high DFA so that they may use adaptive techniques, thoughts, and behaviors to cope with and succeed in the dental environment [6]. Coping strategies require a cognitive process with conscious actions in a dynamic process that changes over time in response to objective demands and subjective appraisal of the situation, and is heavily influenced by motivation and emotion [6,7]. Cognitive and behavioral interventions have been shown to be successful longer-term effects on significantly reducing DFA in patients [9,23].

1.4: Behavior Guidance Techniques for Adults

The desire to have control in an environment is a basic need that the dental office often challenges [35]. Milgrom et al. showed that patients who reported high dental fear shared a common trait of perceived lack of control; these patients were 15.9% less likely to return to the dental office [36]. Enhancing control builds trust through communication and cooperation with the dental team, but requires the patient to be willing to take an active role in the communication [3]. Since uncertainty provokes anxiety, preparatory information can act to enhance control [9]. This is especially important for DFA patients as there is a relationship between anxiety and the desire for control [35]. Detrimentally, many patients feel obligated to "push through" dental treatment and ignore their feelings or uncertainties; this behavior can inadvertently lead to anxiety so excessive that patients are unable to calm themselves down enough to continue treatment [3]. It is essential that the dental

team intervene to prevent this type of escalation by providing patients with a sense of control. This perception of control in frightening situations actually reduces physiological and clinical measures of anxiety [4], preventing escalation. There are different ways to enhance a patient's sense of control during dental treatment with some of the most popular techniques being communication, tell-show-do, rest breaks, and signaling [3,9]. Utilization of any of these techniques should take into consideration the patient's personality or demeanor.

Communication is the establishment of an effective two-way interaction that acknowledges a patient's verbal and non-verbal cues while demonstrating empathy and providing information to correct anticipatory misconceptions [2,3]. Patients' feel an increased rapport with dentists when they understand and accept their needs and concerns and value this more than technical competence [3]. Observation aids the dentist to recognize if the patient received the intended message, which is critical since patients with DFA have difficulty listening to what is trying to be construed [2]. Dentists should anticipate the thoughts and feelings of a patient with DFA, and use verbal communication to mold these negative perceptions. Since many patients do not understand medical jargon, it is important to relate and differentiate familiar thoughts or feelings. Explanations of new and strange procedures help a patient cope and understand [4]. Vocabulary should be adjusted by avoiding words such as "pain" or "hurt" and replacing them by "discomfort" or "bother" to prevent negative

outcomes [4]. Asking a patient if they are experiencing pain instills the idea that they should or could feel pain at any moment. Communication is key for prevention of DFA by setting the tone for the environment [2].

Dentist' rapport through communication is associated with higher patient satisfaction, reduced anxiety, and overall better outcomes[3]. Non-verbal communication is equally important since a verbal message can be impaired if the dentist's body language is not consistent with the intended message [1]. This is especially true with uncertainty, anxiety, or urgency on the dentist's behalf [1]. Non-verbal communication is the reinforcement and guidance of behavior through appropriate contract, posture, facial expression, and body language; it should be used to enhance the effectiveness of verbal communication and construe a sense of caring, warmth, and support [1,20].

One portion of communication is providing information; information which ranges from procedural (what will happen), sensory (what will be experienced), to coping (what the patient can do) [9]. The amount of information provided should be tailored to the individual [3,9]; for example those with an internal locus of control will benefit from more specific information [9,37]. One way to gauge the type of information a patient would prefer is to simply ask them [3]. Provisional information can correct misconceptions about treatment and increase a patient's sense of predictability during a procedure [3].

Social modeling (lived or filmed) is an effective way to reduce avoidance behavior in conjunction with reduction of emotional arousal and negative attitudes towards a given fear [19]. It fosters adaptive behavior through vicarious conditioning (observation and imitation of others) [5,11,12,38]. This technique in the form of videos could be an effective and non-intimidating way to deliver pre-procedural information to a patient while preparing them to accept treatment [37,38].

Psychological preparation and stop signals can significantly reduce a patient's pre-treatment anxiety, pain and distress during treatment, and expedite recovery times [39]. They alleviate patients' fears about dentists not knowing when to stop or choosing to ignore them [3], by establishing a mutual knowledge means of communication in advanced [3]. This will build rapport through effective communication that will increase a patient's trust and control [3]. Richardson et al. investigated the use of stop signals and their effects on pain and distress in patients undergoing stressful medical procedures [39]. Although it was only a pilot study, the 17 participants in the experimental group that were told they could halt the medical injections at any time, rated themselves as less distressed during the injections and reported lower state anxiety following treatment in comparison to the control group [39]. This study demonstrated that giving a patient control to stop a potentially threatening procedure may impact their experience of the procedure [39]. Hand signals enhance a patient's real or perceived control over a potentially noxious stimulation, which has been shown to reduce the aversive nature of the stimuli [39].

Contingent Escape is a brief break (5 seconds - 1 minute) of escape contingent upon cooperative behavior (or completing a task), with any disruptive behavior delaying the break [4,5]. This escape condition teaches adaptive and coping strategies while enhancing a patient's sense of control, which in return decreases DFA [4,35]. This technique requires providers to discuss the contingent option in advance with the patient and agree upon the conditions; this discussion is generally enhances trust and is viewed as a mutual effort by DFA patients to aid in a successful visit [3]. For many anxious patients this agreement can act as a powerful motivator since they want to escape the fear-inducing situation [3,38].

For those patients that are shy or unassertive because they do not want to be difficult, the dentist can schedule a 1-minute break after every 5-minutes of treatment, allowing the patients to silently anticipate the upcoming break and increase their predictability and control over the appointment [3]. Practically, non-contingent or unscheduled breaks should always be considered when the dentists senses that the patient is becoming increasingly anxious or restless [3]; this break would be considered a form of distraction [1]. But caution should be taken not to negatively reinforce a particular behavior.

Behavior shaping as defined in the field of dentistry is essentially reinforcement. This psychological principle acts as an incentive to cooperate and behave appropriately [3]. This technique is utilized by the dentist directly, intentionally, and immediately providing a specific response to a patient's behavior

to either positively or negatively reinforce that behavior [2]. Patients cooperate better

when provided with verbal acknowledgement of their cooperation or compliments

on any small progress they have made because their efforts and actions are

positively reinforced [2,3,20]. Positive reinforcement is very effective in preventing

developing anxiety by distracting the patient from negative thoughts and refocusing

them on good behavior [2]. One way to utilize this technique is by setting goals and

expectations for the entire appointment, reiterating the steps throughout the

appointments, and then continually reminding the patient of the progress they have

made [2].

Systematic desensitization was first introduced by Wolpe in 1958 and has

been shown to be very effective in treating a vast variety of fears and anxieties [19].

Identifying a specific stimulus that evokes fear allows the dentist to remove that

stimulus and introduce it slowly to reduce or eliminate fear [34]. This technique

involves gradually exposing a patient with DFA to an aspect of dentistry that they

find frightful while coinciding relaxation strategies to reduce anxiety [3]. It has been

shown to have a greater reduction in fear and mood improvement after dental

treatment than those patients premedicated with diazepam; these results remained

consistent at a 10 year follow-up [3]. One form of systematic desensitization is

successive approximation, which involves gradually exposing a patient to a more

invasive procedure while allowing them to maintain a sense of control, this includes

things like running handpiece with a bur next to a tooth, then slightly touching the

tooth, and then finally on the tooth to acclimate the patient [2].

A simple variant of systematic desensitization is tell-show-do; traditionally this technique requires an age (developmentally) appropriate verbal explanation of procedure, followed by a demonstration that engages as many senses as possible (visual, auditory, olfactory, and tactile), then completion of the procedure without deviating from the established plan [1,5]. This common pediatric technique can be utilized in the adult population to promote a sense of control and predictability by familiarizing the patients with the dental setting through learning and understanding of procedures [1,3,5,11]. It has been recommended that this technique be modified to "explain-ask-show-do" to more appropriately suit adults [3].

Although not essential, progressive muscle relaxation is a good way to ease into distraction and imagery by tuning the mind into focusing on something other than obsessive DFA thoughts. This relaxation technique has been standardized by therapists due to its success in managing and treating anxiety disorders, including effective treatment of DFA [3]. It is reported to have more significant reductions in DFA than cognitive therapy [3]. Success is based on practice and physiological principals; when a muscle is released after tension it becomes more relaxed than its initial state, which triggers a relaxation response in the body [3].

Diaphragmatic (relaxation breathing) should accompany all other behavior guidance techniques if possible. If performed correctly, this technique will physiologically induce relaxation due to the difficulty of abdominal breathing with

20

tension and its incompatibility with "fight or flight" reactions [3]. This techniques requires either slow and steady breathing or slowly breathing will holding breath for 5 seconds at the end of each inspiration [3].

Guided imagery and distraction effectively reduces anxiety by diverting focus from the task at hand [1,3,14]; it works very well when combined with a relaxation technique [3]. Studies in neuroscience have demonstrated measurable physiologic effects on the central nervous system caused by hypnosis, mental imagery, and placebo treatment on pain modulation [4]. In order to be effective this usually requires practicing in the office [3]. This is an effective strategy to enable patients to control stress [35] and is more effective when the patient is aware that participation will lead to the desired outcome of reduced DFA [9].

Hypnosis requires specialty training and goes one step further to attempt to influence a person's perceptions, feeling, thinking, and behavior by asking to concentrate on ideas and images that are intended to evoke a desired effect [3]. It elicits a state of deep relaxation that focuses on disengaging extraneous stimuli in order to understand why dental anxiety developed, resolve feelings about past experiences, and prepare for desensitization in the future [3].

Intensive cognitive therapy that aims to analyze a patient's thoughts, beliefs, interpretations, and how they interact with emotions [9] should be left to a licensed psychotherapist; mild cognitive therapy that aims to facilitate a new understanding

and restructure a patient's mind to no longer fear a specific stimulus [9] can be

attempted by the general dentist with little or no risk [3,9]. Restructuring a patient's

negative thoughts begins by identifying the potential catastrophic event imagined,

followed by challenging the patient for evidence that it has a potential to happen,

concluding by replacement with more realistic thoughts [3]. Allowing a patient to

realize the catastrophic event is unrealistic will enhance their control over negative

thoughts [3]. Although a licensed psychotherapist may be the most knowledgeable on

how to effectively utilize non-pharmacological techniques, it is likely that a pediatric

dentist would be the most knowledgeable on how to efficiently apply these

techniques.

1.5: Alternative Clinical Practice Approaches

Dental environment outside of social interaction from the dental staff can

influence an individual's level of anxiety [3]. While it may seem obvious that the

sights, sounds, smells, and sensations of a dental environment increase anxiety [3],

utilization of scents in the waiting room such as lavender can actually decrease state

anxiety, or the patient's current level of anxiety [40].

Providers may also consider alternatives for tooth preparation such as:

interim therapeutic restorations, air abrasion, or laser dentistry [3]. Interim

Therapeutic Restoration (ITR) is a procedure in which only soft, demineralized

tooth tissue is removed with hand instruments alone followed by placement of an

adhesive restoration such as resin-modified glass ionomer [1]. Although this

procedure should only be considered a temporary solution and works best with small one or two surface restorations [1], it is considered a reasonable alternative for patients with DFA [3]. Air abrasion works well for those patient's with anxiety related to the noise of the dental environment, and can reduce the need for anesthesia. Laser dentistry can may be noisy, but can eliminate the need for the fear-provoking injection [3], which can greatly reduce the anxiety of some patients.

Treatment planning with DFA patients should be flexible and introduced in phases in effort not to overwhelm the patient by the extent of treatment that is required [3]. The provider should try to start with the least fear-evoking, least painful, or least traumatic treatment in effort to desensitize the patient to the dental environment and aid in building trust [3]. The dentist should allot extra time to control fear-induced problems [16], and must also be prepared to stop treatment and set more realistic goals for future appointments, if needed [3].

Lastly, recommendations have been made in regards to scheduling appointments for DFA patients. They should be scheduled at a time when the patient will not be rushed or stressed [3]. Early morning tends to be the best time as it reduces the amount of time the patient has to stress about the upcoming appointment and tends to decrease the likelihood that they will have to wait when arriving at the office [3]. Patients should be encouraged to bring a friend to appointments to act as a social support and should be contacted between appointments to reinforce their commitment to attend [3].

1.6: Types of Fear

According to Armfield, Milgrom et al have described 4 typologies of dental fear; they include, fearful of a specific stimuli, fearful of a medical catastrophe, generalized dental anxiety, and distrust of dental personnel [3]. Understanding these different typologies can aid in dictating proper management of DFA [3].

In patients who are fearful of a specific stimulus, there is a particular aspect in dentistry that they find the most aversive; such as, the needle, sight, sound, smell, or pain association with treatment. This type of patient responds best to systemic desensitization in conjunction with relaxation strategies, and the fear can be extinguished after the patient has multiple positive experiences with the associated stimuli [3].

In patients who are fearful of a medical catastrophe, there is a concern that something will occur during the treatment that will cause a medical emergency, like an allergy, heart attack, chocking, or they will be unable to breath. They patient's may report that they are allergic to local anesthetic due to previous autonomic reactions to epinephrine making them feel heart palpitations and short of breath, this fear of a life-threatening reaction many cause them to request that the dentist does not use local anesthetic with epinephrine, which in return to could lead to pain, which negatively reinforces the dental visit [3]. It is best to refer these patients to an allergist so they can be educated and reassured that they are not allergic to the local anesthetic, in addition, the dentist should help them relate their feelings to an

adrenaline rush, reinforce that the reaction is common, and teach relaxation

techniques [3]. For those patients that feel they are unable to breath with the rubber

dam, the provider may have to place the rubber dam and let the patient practice

breathing and swallowing before commencing any work [3]. Education is very

beneficial to this group [3].

Patients with generalized dental anxiety experience a significant amount of

anxiety in anticipation of dental treatment without being able to identify one

specific aspect that is difficult for them because they feel it is all terrible [3]. These

patients are more likely to report other fears outside of dentistry, have difficultly

sleeping the night the appointment, and feel physically and emotionally exhausted

after treatment [3]. They worry about the procedure itself, their own behavior, their

ability to manage anxiety, what treatment is needed or not needed, and whether the

dental staff is judging them [3]. This group responds well to reassurance before,

during, and after a procedure to help alleviate worry; this reassurance during the

procedure is especially helpful to redirect a patient worrying about the future back

to the present [3]. These patients respond well to behavior shaping with positive

reinforcement, and care should be taken to train the individual to cope with anxiety

and master relaxation techniques [3]. This particular type of patient sets unrealistic

expectations and tries to push ahead before they are prepared [3].

Those patients that distrust the dental personnel typically come across as

argumentative, insulting, or suspicious of the dental practitioner's motives [3]. These

patients are sarcastic and react to expensive treatment plans saying that the dentist is trying to buy a new car. This behavior stems from worry that the dental team views them in a negative light and great concern about lack of control during treatment [3]. This type of patient is best managed with enhancing control and extensive information; they should be encouraged to get a second opinion from another dentist (reassures that dentist is not trying to "pull one over on them"), every aspect of treatment plans should be thoroughly explained including all alternative options and consequences, and permission should be requested prior to moving chair, using instruments, or doing an exam. This type of patient may also benefit from an explanation of all actions throughout a procedure so they are aware of what is happening during the dental treatment and the availability of a hand mirror to watch, if desired. Once trust is established, this type of patient is relatively straight forward to treat [3].

1.7: Patient's Perceptions

Forbes et al. studied patients with dental phobia that were referred to a sedation center for extreme dental fear and their acceptability of behavior therapy. The majority of participants (77%) wanted to overcome their fears, with a minority (35%) feeling that it was not possible. Interestingly, those with previous IV sedation treatment had a decreased perception that it was possible to overcome dental fear. Regardless of treatment scenario the most important factor of patient acceptability of treatment modality (behavior therapy versus sedation) was a good

outcome, with treatments perceived as reducing subsequent anxiety and encouraging future stress-free dental visits being the most acceptable [41].

1.8: Future of Dental Fear and Anxiety in Adults

Dental treatment alone will not address the basis of DFA in patients, which is why collaboration of dentists and psychologists is essential for lasting results [24]. Although the entire dental field could benefit from additional training in the behavior sciences, the pediatric dentist is in a unique position that could aid in reincorporation of non-pharmacological behavior guidance into adult dentistry. Pediatric dental research and education should work towards establishing a behavior guidance foundation for the practitioner who sees adult patients to enable them to fully understand and apply techniques comfortably in a routine practice setting. Pharmaceutical intervention without attempting behavior guidance first is considered unethical in the pediatric population due to the risk of morbidity or mortality [20]; soon this may be true of the adult population, as models for non-pharmacological management of adults with DFA continue to emerge from international studies [9,16,24,27,41]

Given the substantial evidence supporting the effectiveness of behavior guidance techniques on adult and pediatric populations in the literature in conjunction with the well documented devastating results of not appropriately addressing DFA in the dental office would lead one to expect to find an overwhelming amount of literature illustrating the most efficient ways to

incorporate behavior guidance techniques into the dental practice. The scarcity of literature on this topic leads to the research question, are licensed U.S. dentists competent in treating adults with DFA, as a function of the quality and quantity of behavior guidance dental education received?   The overall hypothesis, overall aim, and specific aims that this study intends to investigate are as follows:

1.9: Objectives/Aims and Hypotheses

<u>1.9.1: Overall Hypothesis</u>

H0 =   Dentists perceive that quality and quantity of their behavior guidance education enables them to effectively treat adults with Dental Fear and Anxiety (DFA).

H1 =   Dentists do not perceive that the quality and quantity of their behavior guidance education enables them to effectively treat adults with Dental Fear and Anxiety (DFA).

<u>1.9.2: Aims</u>

1.9.2.1: Overall Aim

The overall aim is to investigate dentists' skills in treating dental fear and anxiety in adult patients, current strategies used in practice to treat these patients, and explore the need for additional education. This study will define **"most dentists" as ≥75%** of the dentists surveyed. This standard was utilized in a similar survey by Brahm et al [16].

1.9.2.2: Specific Aim 1

Aim: Identify dentists' self-rated efficacy in using behavior guidance techniques for treating patients with DFA.

Ha: If most dentists surveyed do NOT report that they Agree or Strongly Agree that they effectively apply behavior guidance techniques, then most dentists have low competence in managing DFA patients

IV: Efficacy in application of behavior guidance technique

Qualitative Categorical- Ordinal

DV: Competence in managing DFA patients

Qualitative Categorical- Ordinal

Question: 8 (Please see Appendix)

1.9.2.3: Specific Aim 2

Aim: Identify the prevalence of dentists' utilization of behavior guidance strategies for managing Adult patients with DFA.

Ha1: If most dentists surveyed do NOT report that they are Often or Always utilizing behavior guidance strategies on DFA patients, then most dentists are not applying behavior guidance to manage DFA patients.

IV: Utilization of behavior guidance strategies

Qualitative Categorical- Ordinal

DV: Self-perceived application of behavior guidance to manage DFA

Qualitative Categorical- Ordinal

Question: 13 (Please see Appendix)

1.9.2.4: Specific Aim 3

Aim: Examine dentists' self-rated evaluation of curriculum exposure to DFA.

Ha1:   If most dentists surveyed do NOT report a Good or Excellent quality of education, then most dentists had insufficient education in management of DFA with behavior guidance

IV: Self-rated quality of education in DFA

Qualitative Categorical- Ordinal

DV: Insufficient DFA curriculum exposure

Qualitative Categorical- Ordinal

Question: 20 (Please see Appendix)

Ha2:   If most dentists surveyed do NOT report Sufficient of Excellent quantity of time devoted to DFA education, then most dentists had insufficient education in management of DFA with behavior guidance

IV: Self-rated quantity of education in DFA

Qualitative Categorical- Ordinal

DV: Insufficient DFA curriculum exposure

Qualitative Categorical- Ordinal

Question: 21 (Please see Appendix)

Aim: Evaluate dentists' self-rated understanding of the conceptual framework

underlying behavior guidance techniques to identify if behavior guidance

techniques can be properly applied.

    Ha: If most dentists surveyed do NOT Agree or Strongly Agree on their

        understanding of the conceptual framework underlying behavior

        guidance techniques, then they are not aware of proper application of

        behavior guidance techniques on DFA patients.

    IV: Understanding of conceptual framework

        Qualitative Categorical- Ordinal

    DV: Proper application of behavior guidance techniques

        Qualitative Categorical- Ordinal

    Question: 9 (Please see Appendix)

1.9.3: Implications of Rejecting Hypothesis

Rejection of the null hypothesis after completion of this survey will identify

the need to reincorporate and strongly emphasize the fundamental concept of

behavioral guidance back into dental education through schools, continuing

education courses, and literature. Incorporation of such would enhance the skill of

practitioners graduating from dental schools, directly benefiting the dental staff and

all patients.

Chapter 2: Methodology

2.1: Design

This was a non-experimental descriptive study of the attitudes/beliefs of

dentists on behavior guidance techniques practiced on adults, without intervention.

The nature of the investigation was quantitative and cross-sectional with simple

random sampling from the study population (limited by response rate) to enable

generalization to the theoretical population of Dentists treating adult patients with

DFA. All identified threats to internal validity were taken into consideration during

the design of the study and can be viewed in the Table 1 below:

Table 1. Identified Threats to Internal Validity and How they were Controlled for
during the Survey Design Phase

Threat	Presence	How Controlled
Selection Threat	Yes	Random Sampling from National population
History Threat	Yes	Cross-sectional study
Maturation Threat	No	Cross-sectional survey
Testing Threat	No	One-time survey
Instrumentation Threat	Yes	Focus Group / Randomization of Questions within sections
Mortality Threat	Yes	Random Sampling / 1 Sample
Selection-maturation Threat	No	Cross-sectional survey
Experimenter Bias	Yes	Focus Group / May Appear Leading due to Specific Focus

2.2: Target Population

The theoretical population for which this study was based is each dentist in

the U.S. that fits the inclusion criteria (all 50 states). More specifically, the study

population will be dentists who are members of the American Dental Association

(ADA). The inclusion criteria will include those ADA members who are active U.S.

licensed dentist, who graduated from a U.S. dental school, that practice 2 or more days per week, and treat a patient population that consists of some or all Adults. Dentists who only interact with adult patients as an attending/supervisor or have a specialty degree in pediatric dentistry were excluded from this study. Initially, those that only treated adults by pharmacological means were supposed to be excluded from the study, but after collecting survey data and receiving feedback from some participants it became clear that this particular group also needs to manage dental fear and anxiety (DFA) in the dental office and should not be excluded. The population is considered heterogeneous since not all dental practitioners see the same amount or intensity of patients with dental fear and anxiety (DFA). The goal was to be able to generalize these results to the average practicing U.S. dentist that treats adult patients with dental fear and anxiety (DFA).

2.3: Sample Size

The Sample Size was initially based on the literature taking into consideration the number of surveys sent and the response rate of the two surveys modeled, which were the following:

Table 2. Sample size and Corresponding Response Rates for Similar Non-United States Studies

Surveys	Dentists'... [16]	Management... [27]
Sent	1,293	2,708
Received	889	346

But since the high response rates reported in these studies are not likely applicable to a US study that surveys ADA members, these studies served as an example that statistically significant results were obtained in similar studies. Therefore, the sample size was calculated by applying a statistical formula in conjunction to a consultation with a Nova Southeastern University statistician (Dr. Patrick Hardigan, PhD). A sample size of 6,000 was decided based on Cochran's formula for categorical outcomes. This particular formula was deemed most appropriate since the majority of the survey instrument will utilize a Likert scale. Calculations for the sample size required to obtain statistically significant results in addition to the predicted outcome based on response rate (determined by professional judgment) are illustrated below:

Sample size required to have sufficient statistical power:

$$N = [(n^2)(s^2)]/d^2$$

Sample Size $= [(95\% \text{ CI}^2)((4/3)^2)]/[(0.05)(4)]^2$

Sample Size $= [(1.96^2)(1.33^2)]/0.20^2$

Sample Size $= [(3.8416)(1.7689)]/0.04$

Sample Size = 170

Due to the specific population being surveyed, a very low response rate has been predicted.

<u>Predicted outcome of sample population size necessary to obtain desired statistical</u>

<u>significant sample size:</u>

Predicted Outcome = Sample Size/5% response rate

Predicted Outcome = 170/0.05

Predicted Outcome = 3,400

At the recommendation of the NSU statistician (Dr. Patrick Hardigan PhD), the sample population size was increased to 6,000 since the resources are available and will contribute to a decreased risk of under-sampling the population.

<u>Final sample population size based on expert opinion and Cochran's formula:</u>

Sample population size = 6,000

2.4: Research Instrument

After an exhausted search, no instrument existed that would answer the proposed research question; therefore a survey was created using two recent international studies as models: "Dentists' skills with fearful patients: education and treatment." [16] and "The management of dental anxiety and impact of psychosomatic factors on dentistry: Is recent scientific research translated into German dental practices?" [27] Since this is an original survey that has not been used in prior studies, it was distributed to both a formative and summative committee to aid in finalizing design and validation of questions. There were 3 participants in the formative committee and 2 participants in the summative committee. Committee

members were selected by the principal investigator based on convenience and area

of expertise; all members belong to one of the following categories: statistician who

teaches survey design classes, ABA therapist, or pediatric dentist.

The survey was modified until all members of both committees were

satisfied. There was only one unresolved issue between committee members with

regards to how to ask participants about their level of agreement. Since all parties

could not come to an agreement amongst the formative and summative committees,

the Principle Investigator and one research committee member made the finial

decision.

The survey was further validated with the aid of a focus group comprised of

4 professional colleagues, none of which belonged to the principle investigator's

research committee, formative committee, nor summative committee. Any person

belonging to one of these committees or the focus group was not allowed to be

participants in the main study (in the event that they were randomly selected).   The

survey recruitment material (email content/survey cover page) and survey

instrument were distributed to the focus group on paper to evaluate and take

individually, followed by a group discussion addressing any recommendations for

modifications.

Concise definitions for behavior guidance techniques [2,3] were provided at the

top of both survey pages that contained questions referring to these techniques.

These definitions were not intended to educate the practitioner on how to apply

specific techniques, but rather to inform them of the specific process denoted by the

title. The definitions provided can be viewed below in Figure 1. To help ensure that

participants read definitions prior to commencing the survey while controlling for

the instrument threat to internal validity, all questions were randomized on each

page of the survey instrument with the exception of questions 1-5. Question 1-4

consisted of disqualifying questions only, while question 5 asked, "prior to reading

the definitions above…"

Figure 1. Definition of Behavior Guidance Techniques Provided in Survey
Instrument

Definitions of Behavior Guidance Techniques

Behavior Shaping: A direct intentional response (by dentist) immediately following a behavior (by patient) to positively or negatively reinforce that behavior. (i.e verbal praise).

Communication/Education: Effective two-way interaction that acknowledges patient's hesitation/apprehension while demonstrating empathy. (i.ei providing information to correct misconceptions).

Distraction/Imagery: Directing attention or mental focus to a specific alternative stimuli or situation.

Successive Approximation: Slowly exposing a patient to a more invasive procedure while allowing them to maintain a sense of control. (i.e. running a handpiece with the bur next to a tooth, then slightly touching the tooth, and then finally on the tooth to acclimate the patient).

Signaling: A predetermined signal established between provider and patient that allows the patient to halt any procedure. (i.e. asking patient to raise their hand if they need a break).

Diaphragmatic/Relaxation Breathing: A taught form of slowly paced abdominal breathing to induce a physiological relaxation response.

Progressive Muscle Relaxation: A systematically guided tensing and relaxation of muscles taught to induce a physiological relaxation response.

Finalized recruitment material can be found in Appendix B, while the survey

instrument can be found in Appendix C. All materials distributed to participants in

this study were approved by the Nova Southeastern University's Institutional

Review Board (IRB) prior to interaction with focus group members and broadcast of

the survey instrument.   The initial IRB approval and the IRB amendment approval

forms can be found in Appendix D.

2.5: Selection of Sample Population

A total of 6,000 randomly selected emails (ADA members) were purchased

through a medical marketing agency (MMS Lists). Although 6,000 were purchased,

6,117 emails were actually selected by the company due to routine anticipation that

some emails would be suppressed and never delivered. The MMS list study

population consisted of the following specialties: general practice, oral surgeon,

endodontics, orthodontics, periodontics, prosthodontics, oral pathology, dental

public health, and oral and maxilliofacial radiology. Prior to simple random

sampling, pediatric dentists, students, retired dentists, and those without a US

mailing address were removed from the population pool, which resulted in 194,330

remaining ADA records available for sampling. During the testing phase it was

noted that emails were delivered directly to the junk folder of Gmail accounts; in

response, the decision was made to also exclude Gmail accounts. The MMS agency

reported that they were able to satisfy this request by randomly selecting emails,

manually removing any Gmail accounts, and randomly re-selecting replacements.

Since use of MMS selection criteria would not completely satisfy inclusion and

exclusion criteria of this study, disqualification questions were included at the

beginning of the survey instrument.

Of the 6,117 selected emails, only 5,363 (91.05%) were deliverable without

being suppressed (omitted due to opt outs) or bounced (rejected by email server).

The remaining 5,363 email addresses were sent a link to survey (Survey Monkey) in

January 2015, with one reminder sent 2 weeks prior to closure of the survey. The

survey instrument was available to the sample population for a total of 4 weeks

from the initial email.

2.6: Statistical Data Analysis

Data coding was performed with assistance from Dr. Vinodh Bhoopathi BDS

MPH DScD and analysis was performed using statistical software Stata 13 by Dr.

Patrick Hardigan PhD.   Frequencies and percentages will be calculated for

categorical variables. Means and standard deviations for continuous variables will

be calculated. One tailed z proportion test will be used to test the hypotheses. All

aims identified in the introduction will be satisfied by the following procedure:

For Aim 1:   Question #8 will be used to achieve this aim. A new dummy variable

will be created for question #8. Those who respond to categories

"agree" and "strongly agree" will be categorized into one group and

those responding to other 2 categories will be categorized into

another group. A one-tailed z-proportion test will be run to test

differences in proportion of dentists who agree they can effectively

apply behavior guidance techniques compared to those who do not.

For Aim 2: Question #13 will be used to achieve this aim. A new dummy variable will be created for question #13. Those who respond to categories "often" and "always" will be categorized into one group and those responding to other 2 categories will be categorized into another group. A one-tailed z-proportion test will be run to test differences in proportion of dentists who often utilize the behavioral strategies compared to those who do not

For Aim 3: Quality: Question #20 will be used to achieve this aim. A new dummy variable will be created for question #20. Those who respond to categories "good" and "excellent" will be categorized into one group and those responding to other 2 categories will be categorized into another group. A one-tailed z-proportion test will be run to test differences in proportion of dentists who report a good or excellent quality of dental school education in the management of adults with DFA compared to those who do not.

Quantity: Question #21 will be used to achieve this aim. A new dummy variable will be created for question #21. Those who respond to categories "sufficient" and "comprehensive" will be categorized into one group and those responding to other 2 categories will be categorized into another group. A one-tailed z-proportion test will be run to test differences in proportion of dentists who report a sufficient

or comprehensive amount of time in their dental school curriculum was devoted to education on the management of adults with DFA compared to those who do not.

For Aim 4:   Question #9 will be used to achieve this aim. A new dummy variable will be created for question #9. Those who respond to categories "agree" or "strongly agree" will be categorized into one group and those responding to other 2 categories will be categorized into another group. A one-tailed z-proportion test will be run to test differences in proportion of dentists who agree that they understand the conceptual framework underlying behavior guidance techniques compared to those who do not.

After all aims are satisfied in this study, the statistical group, consisting of the principle investigator, research mentor, and a statistician will meet to discuss significant results in anticipation of applying additional statistical tests such as, Wilcoxon Mann-Whitney, Kruskal-Wallis, Spearman's Rho, or Bivariate Logistic Regression to appropriate variables if deemed appropriate.

2.7: Limitations of Study

Communication with the study population through a survey will be the largest limitation in this study. This particular population can be difficult to reach due to very busy schedules and lack of incentive to complete a survey. In recent

years, many surveys have flooded email inboxes reaching out to dentists through

academic associations. This will drastically affect the overall response rate to the

survey. This also implies that the respondents may not accurately represent the

theoretical population. Communication will also be a major barrier since there will

be no way to thoroughly educate participants on behavior guidance, specific

techniques, and adult patients defined as having DFA by this survey with more than

a brief synopsis at the beginning of the survey. Some providers may be using the

exact same technique without all identifying that they are doing so on the survey.

Additional limitations may include accuracy of reporting, inability to observe clinical

skills to determine level of proficiency, and limited ability to thoroughly assess

quantitative and qualitative education of practitioner through a short survey.

Chapter 3: Results

3.1 Survey Responses

The survey was available for 4 weeks; during this time 234 participants started the survey. One participant was immediately excluded due to not answering all of the qualifying questions. At this time it was also noted that a larger than expected number of participants (16.88%) answered that they only treat adults with pharmacological management, which can be visualized in Figure 2. It was then decided that these participants should not be excluded from the results since they also manage the DFA of adults in the dental office. Questions 1, 2, and 3 were used to exclude a total of 13 participants from the study; two of which were excluded due to not graduating from a U.S. accredited dental school and not practicing 2 or more days per week. Responses to qualifying questions can be viewed below in Table 3.

Table 3. Qualifying Questions Designed for Exclusion Purposes

Qualifying Questions	Yes % (n)	No % (n)
Graduated from a U.S accredited dental school. (m=0) **Q1**	97.00% (n=226)	3.00% (n=7)
Practice dentistry 2 or more days per week. (m=1) **Q2**	96.98% (n=225)	3.02% (n=7)
Treat adult patients. (m=0) **Q3**	99.57% (n=232)	0.43% (n=1)
Only treat adults with pharmacological... (m=2) **Q4**	16.88% (n=39)	83.12% (n=192)

m represents the number of survey participants that skipped a particular question

Figure 2. Providers whom only Treat Adults with Pharmacological Management (Q4)
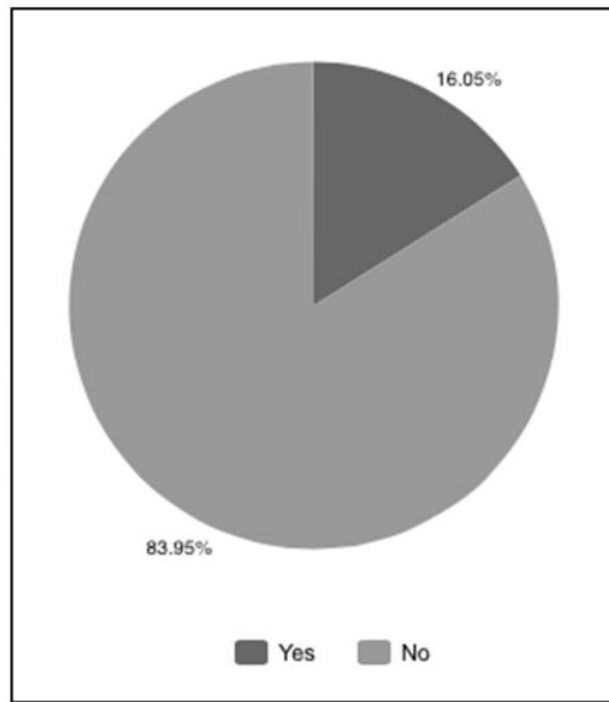
After excluding the 13 participants from the 233 that answered the

qualifying questions, 220 responses remained. At this time 57 additional responses

were excluded from the analysis due to limited or no answers provided after

completing the qualifying questions. One additional participant was removed due

incompletely answering behavior guidance technique questions. After removing

these participants, 162 remained for calculation of frequencies and analysis.   The

overall response rate of eligibly candidates who completed the survey from the

study population was 3.28%. This was calculated using the following formula [42]:

$$\text{Response Rate} = \cfrac{\text{Completes}}{\left(\text{Completes}\right) + \left(\cfrac{\text{Completes}}{\text{Completes} + \text{Not Qualified}} \times \left(\text{Not Contacted} + \text{Refused}\right)\right)}$$

The response rate of those who chose to start the survey, were deemed eligible, and completed the survey was 75.21%.

3.2 Frequencies

Frequencies presented in this study reflect all responses given by participants, including those participants that provided two answers to a question rather than just one. Demographic information was recorded at the end of the survey instrument in order to capture only those participants that qualified and completed the survey. It was also designed in this manner to enable participants to complete lengthy questions first and save simple questions for the conclusion of the survey in order to prevent fatigue during reading and answering question. Demographic information can be view below in Table 4.

Table 4. Demographic Characteristics of Participants that met all Qualifying Criteria

Demographics/Characteristics of Participants	% (n)
Gender (m=25) Q 27	
Female	24.82% (34)
Male	75.18% (103)
Number of years in practice. (m=24) Q 28	
<1 year	0.00% (0)
2-5 years	2.90% (4)
6-15 years	15.22% (21)
>15 years	81.88% (113)
Extent of dental education. (m=25) Q 26	
General dentistry degree	40.88% (56)
General dentistry degree with advanced education	29.93% (41)
General dentistry with ADA recognized dental specialty certification	21.17% (29)
Other	8.03% (11)

m represents the number of survey participants that skipped a particular question

Figure 3. Extent of Dental Education reported by Participants (Q26)

8.03%

21.17%

40.88%

29.93%

■ General Dentistry Degree   ■ General Dentistry Degree with Advaced Education

■ General Dentistry with ADA Recognized Dental Specialty Certification   □ Other
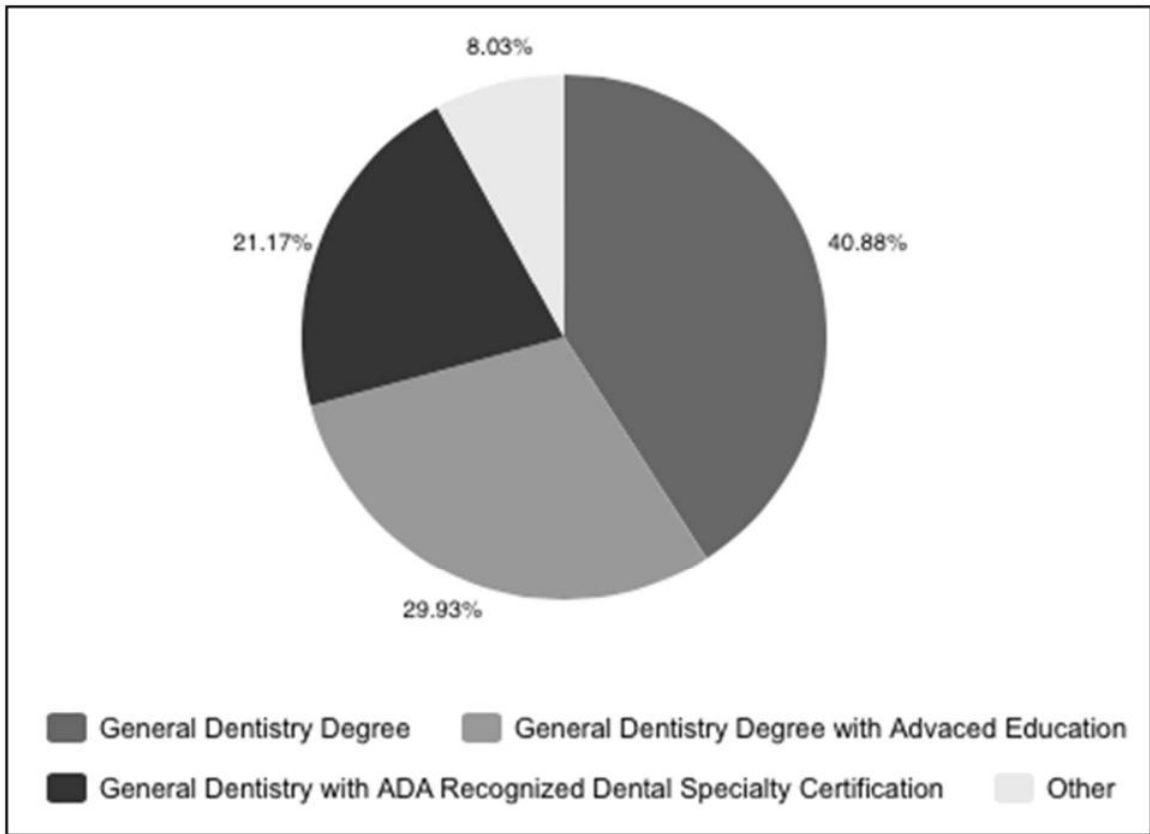
Demographic characteristics shown in Table 4 and Figure 3 demonstrate that the majority of respondents were male (~75%), have been in practice for over 15 years (~80%) and have advanced education beyond their general dentistry degree (~60%).

As previously stated in the methodology section, participants were provided with definitions of the specific behavior guidance techniques at the top of each page that contained questions referring to such techniques (shown in Appendix C). Question 5 (the first question after the disqualifying questions) was the same for each participant. This question was used to gauge the practitioner's self-perceived familiarity with each behavior guidance technique. As demonstrated in Table 5 and Figure 4 the majority of participants felt that they were familiar with every technique, with exception to progressive muscle relaxation, prior to reading the survey definitions. The two most familiar techniques were Communication/Education (~94%) and Signaling (~92%), which the least familiar techniques were Diaphragmatic Breathing/Relaxation (~66%) and Progressive Muscle Relaxation (~40%).

Table 5. Awareness of Behavior Guidance Techniques (BGT) Prior to Reading Provided Short Definitions.

Awareness of behavior guidance techniques (BGT)	Yes % (n)	No % (n)
Prior to reading provided definitions, survey participant was familiar with BGT Q5		
Behavior Shaping (m=2)	80.63% (129)	19.38% (31)
Communication/Education (m=1)	94.41% (152)	5.59% (9)
Distraction/Imagery (m=0)	86.96% (140)	13.66% (22)
Successive Approximation (m=2)	73.75% (118)	26.25% (42)
Signaling (m=5)	92.36% (145)	7.64% (12)
Diaphragmatic Breathing/Relaxation (m=2)	66.88% (107)	33.13% (53)
Progressive Muscle Relaxation (m=2)	40.63% (65)	59.38% (95)

m represents the number of survey participants that skipped a particular question

Figure 4. Awareness of Behavior Guidance Techniques (BGT) Prior to Reading Provided Short Definitions. (Q5)
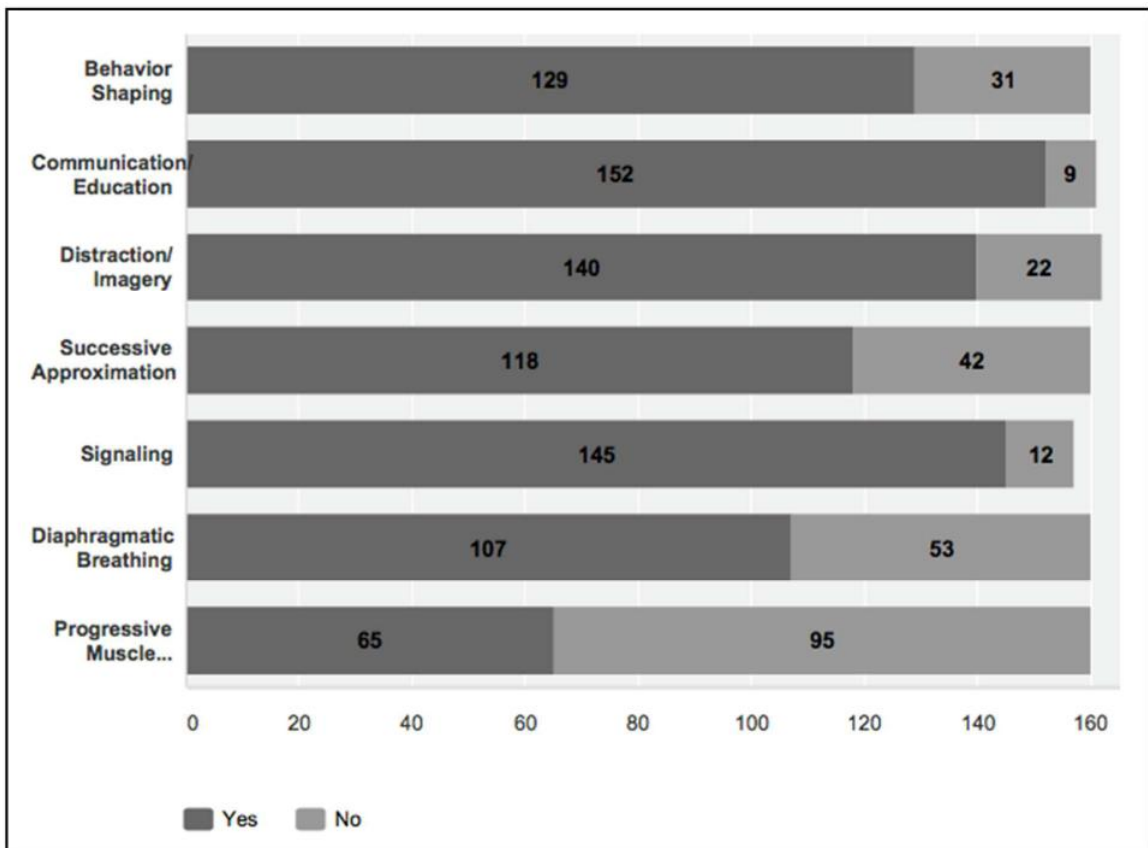
To investigate the utilization of behavior guidance techniques and strategies, participants were questioned in regards with whether or not they felt; particular techniques were appropriate to use (Table 6, Figure 5), they were effective when properly trained (Table 6, Figure 6), specific behavior strategies were effective in their office (Table 6, Figure 7). In addition they were inquired about the frequency at which they apply specific behavior strategies (Table 6, Figure 8).

Table 6. Utilization of Behavior Guidance Techniques (BGT) and Strategies

Use of behavior guidance technique (BGT) and strategies	Strongly Agree % (n)	Agree % (n)	Disagree % (n)	Strongly Disagree %(n)
Specific behavior guidance techniques is appropriate to use. Q6				
Behavior Shaping (m=0)	50.62% (82)	45.06% (73)	4.32% (7)	0.00% (0)
Communication/Education (m=0)	62.35% (101)	36.42% (59)	1.23% (2)	0.00% (0)
Distraction/Imagery (m=1)	50.93% (82)	43.48% (70)	4.97% (8)	0.62% (1)
Successive Approximation (m=3)	42.77% (68)	50.31% (80)	6.29% (10)	0.63% (1)
Signaling (m=2)	58.75% (94)	37.50% (60)	3.75% (6)	0.00% (0)
Diaphragmatic Breathing… (m=6)	43.59% (68)	47.44% (74)	8.97% (14)	0.00% (0)
Progressive Muscle Relax… (m=13)	34.23% (51)	53.02% (79)	12.75% (19)	0.67% (1)
If properly trained, specific behavior guidance technique is effective. Q7				
Behavior Shaping (m=3)	42.77% (68)	50.94% (81)	6.29% (10)	0.00% (0)
Communication/Education (m=2)	57.50% (92)	38.75% (62)	3.75% (6)	0.00% (0)
Distraction/Imagery (m=5)	47.77% (75)	43.95% (69)	8.28% (13)	0.00% (0)
Successive Approximation (m=8)	37.66% (58)	50.00% (77)	11.69% (18)	0.65% (1)
Signaling (m=5)	54.14% (85)	39.49% (62)	6.37 (10)	0.00% (0)
Diaphragmatic Breathing… (m=10)	37.50% (57)	50.66% (77)	12.50% (19)	0.00% (0)
Progressive Muscle Relax… (m=18)	28.47% (41)	53.47% (77)	17.36% (25)	0.69% (1)
Survey participant believes the specific strategy is effective in their office Q12				
Reduction of Waiting Times (m=22)	56.43% (79)	39.29% (55)	3.57% (5)	0.71% (1)
Allow Pt to Listen to Music (m=22)	56.43% (79)	40.71% (57)	3.57% (5)	0.00% (0)
Alter Local Anesthetic Tech… (m=22)	47.14% (66)	42.14% (59)	10.00% (14)	0.71% (1)
Divide Tx into Several… (m=22)	37.14% (52)	44.29% (62)	16.43% (23)	2.86% (4)
Give Patient Choices (m=22)	52.86% (74)	40.71% (57)	6.43% (9)	0.71% (1)
Relaxation Techniques (m=23)	41.01% (57)	53.96% (75)	5.76% (8)	0.00% (0)
Thorough Explanations (m=22)	54.29% (76)	41.43% (58)	5.00% (7)	0.71% (1)
Question Pt on Feelings… (m=22)	42.14% (59)	52.14% (73)	6.43% (9)	0.00% (0)
DFA Survey Instrument to… (m=32)	10.00% (13)	54.62% (71)	31.54% (41)	3.85% (5)
	Always % (n)	**Often % (n)**	**Seldom % (n)**	**Never % (n)**
Frequency at which survey uses the specific strategy in their office Q13				
Reduction of Waiting Times (m=22)	52.14% (73)	42.86% (60)	3.57% (5)	1.43% (2)
Allow Pt to Listen to Music (m=22)	45.71% (64)	45.71% (64)	7.86% (11)	2.14% (3)
Alter Local Anesthetic Tech… (m=22)	42.14% (59)	33.57% (47)	20.00% (28)	4.29% (6)
Divide Tx into Several… (m=23)	17.27% (24)	56.83% (79)	23.02% (32)	2.88% (4)
Give Patient Choices (m=22)	61.43% (86)	35.71% (50)	4.29% (6)	0.00% (0)
Relaxation Techniques (m=22)	23.57% (33)	47.14% (66)	25.00% (35)	4.29% (6)
Thorough Explanations (m=22)	74.29% (104)	25.00% (35)	0.71% (1)	0.71% (1)
Question Pt on Feelings… (m=24)	45.65% (63)	40.58% (56)	10.14% (14)	3.62% (5)
DFA Survey Instrument to… (m=26)	2.94% (4)	12.50% (17)	17.65% (24)	67.65% (92)

m represents the number of survey participants that skipped a particular question

Figure 5. Specific BGTs are Appropriate to Use on Adults (Q6)
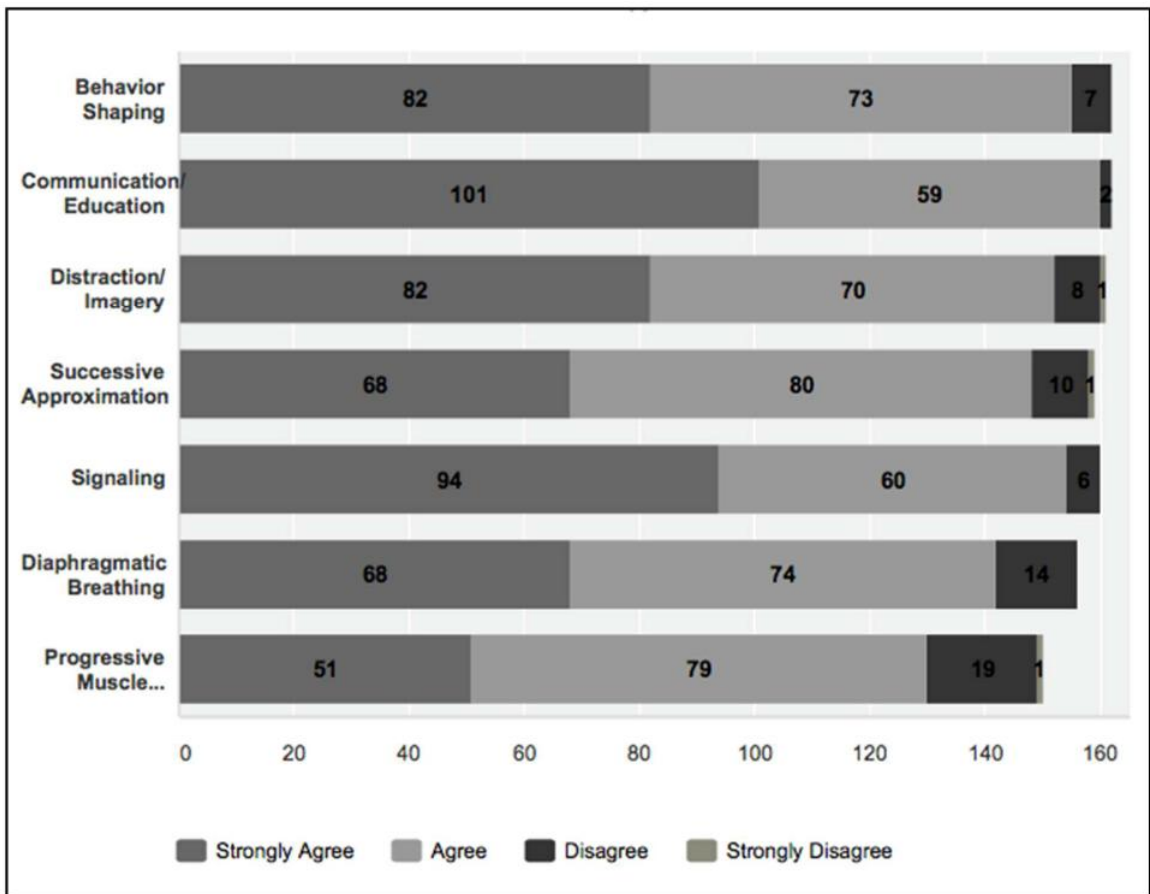
Figure 6. Specific BGTs are Effective, if Properly Trained (Q7)
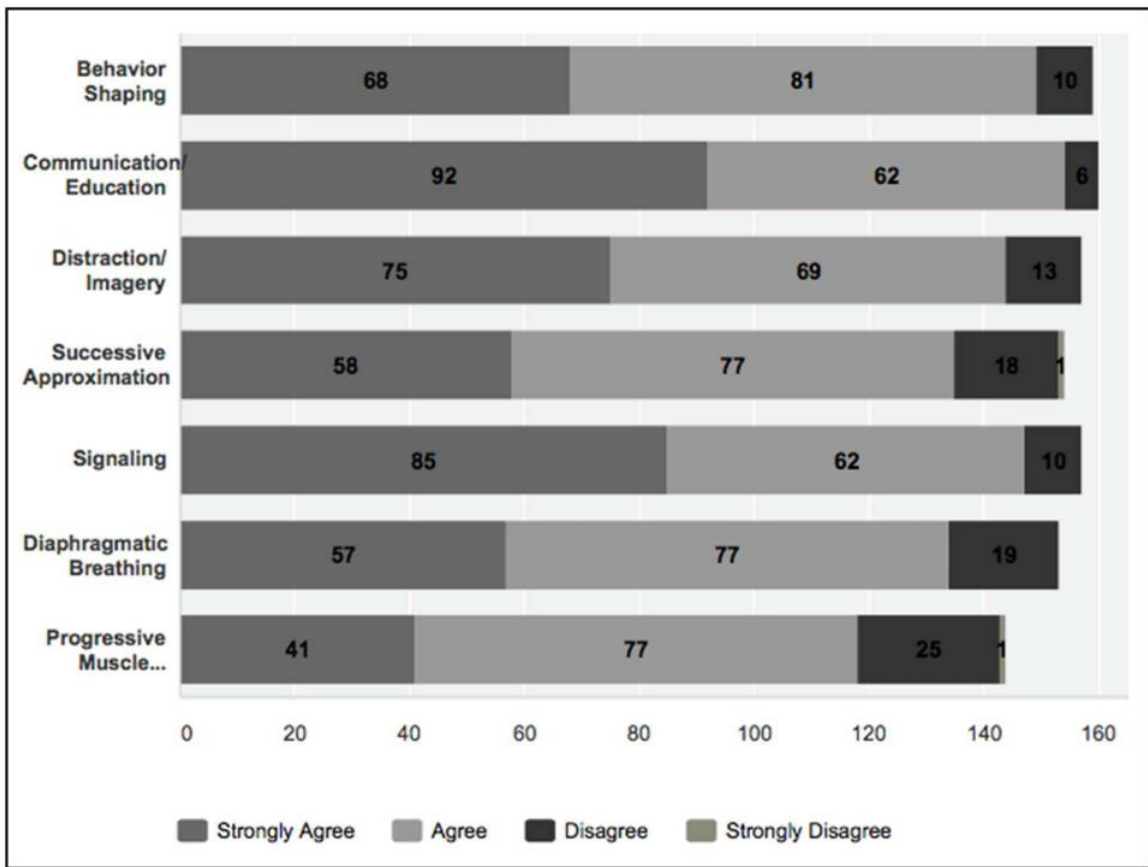
Figure 7. Specific BG Strategy is Effective in Participant's Office (Q12)

Horizontal stacked bar chart showing responses for each BG strategy.

Strategy	Strongly Agree	Agree	Disagree	Strongly Disagree
Reduction of Waiting Times	79	55	5	1
Allow Patient to Listen to…	79	57	5	
Alter Local Anesthetic…	66	59	14	1
Divide Treatment in…	52	62	23	4
Give Patient Choices	74	57	9	1
Relaxation Techniques	57	75	8	
Thorough Explanations	76	58	7	1
Question Patient on…	59	73	9	
DFA Survey Instrument t…	13	71	41	5

Legend: Strongly Agree · Agree · Disagree · Strongly Disagree

Figure 8. Frequency of BG Strategy Use in Participant's Office (Q13)
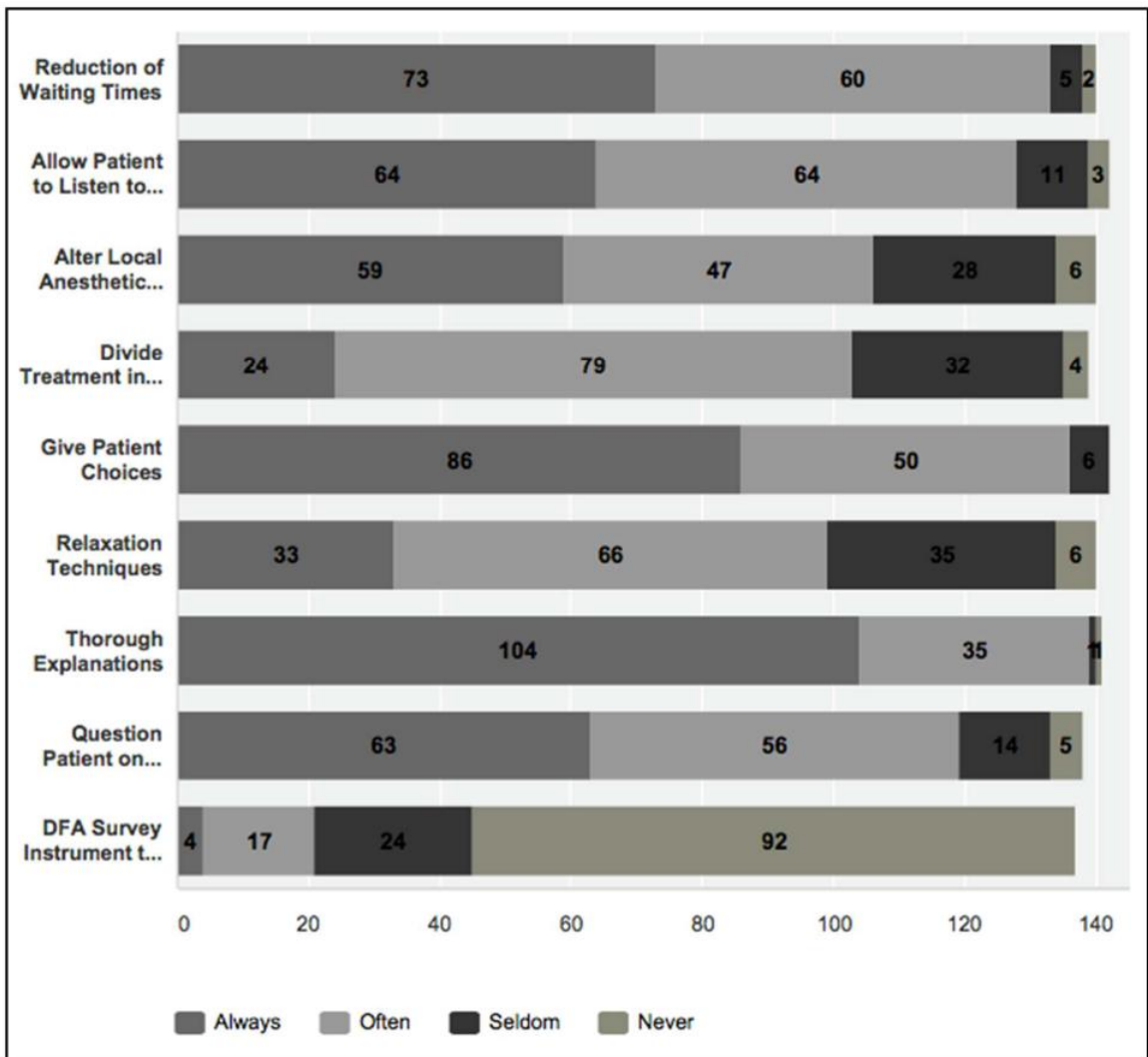
Dentists' perceived competence on the utilization and understanding of behavior guidance techniques were evaluated by inquiring about their belief that; they can effectively apply each specific behavior guidance technique (Table 7, Figure 9), they understand the conceptual framework of each technique (Table 7, Figure 10), they can provide specific examples of how to use each technique (Table 7, Figure 11).

Table 7. Perceived Competence on the Utilization and Understanding of Behavior Guidance Techniques.

Perceived competence using behavior guidance technique (BGT)	Strongly Agree % (n)	Agree % (n)	Disagree % (n)	Strongly Disagree % (n)
Survey participant believes they can effectively apply the specific BGT Q8				
Behavior Shaping (m=2)	41.25% (66)	51.25% (82)	6.25% (10)	1.25% (2)
Communication/Education (m=0)	55.56% (90)	41.36% (67)	3.09% (5)	0.62% (1)
Distraction/Imagery (m=3)	44.65% (71)	45.91% (73)	7.55% (12)	1.89% (3)
Successive Approximation (m=8)	36.36 (56)	51.95% (80)	9.74% (15)	1.95% (3)
Signaling (m=2)	51.88% (83)	41.88% (67)	5.63% (9)	1.25% (2)
Diaphragmatic Breathing… (m=6)	28.21% (44)	48.08% (75)	21.15% (33)	2.56% (4)
Progressive Muscle Relax… (m=13)	18.12% (27)	46.98% (70)	32.89% (49)	2.68% (4)
Survey participant believes they understand the conceptual framework of the specific BGT Q9				
Behavior Shaping (m=24)	44.93% (62)	51.45% (71)	2.17% (3)	1.45% (2)
Communication/Education (m=24)	50.72% (70)	47.10% (65)	1.45% (2)	0.72% (1)
Distraction/Imagery (m=23)	46.76% (65)	50.36% (70)	2.16% (3)	0.72% (1)
Successive Approximation (m=24)	43.48% (60)	50.00% (69)	5.80% (8)	0.72% (1)
Signaling (m=26)	50.74% (69)	47.06% (64)	1.47% (2)	0.74% (1)
Diaphragmatic Breathing… (m=24)	37.68% (52)	46.38% (64)	13.77% (19)	2.17% (3)
Progressive Muscle Relax… (m=28)	27.61% (37)	46.27% (62)	22.39% (30)	3.73% (5)
Survey participant believes they can provide specific examples of how to use the specific BGT Q10				
Behavior Shaping (m=23)	41.73% (58)	50.36% (70)	6.47% (9)	1.44% (2)
Communication/Education (m=23)	53.96% (75)	42.45% (59)	3.60% (5)	0.00% (0)
Distraction/Imagery (m=25)	47.45% (65)	48.18% (66)	5.11% (7)	0.00% (0)
Successive Approximation (m=24)	34.78% (48)	53.62% (74)	10.14% (14)	1.45% (2)
Signaling (m=25)	51.09% (70)	45.26% (62)	3.65% (5)	0.00% (0)
Diaphragmatic Breathing… (m=30)	32.58% (43)	43.18% (57)	21.97% (29)	2.27% (3)
Progressive Muscle Relax… (m=33)	16.28% (21)	42.64% (55)	36.43% (47)	4.65% (6)

m represents the number of survey participants that skipped a particular question

Figure 9. Survey participant believes they can effectively apply the specific BGT (Q8)
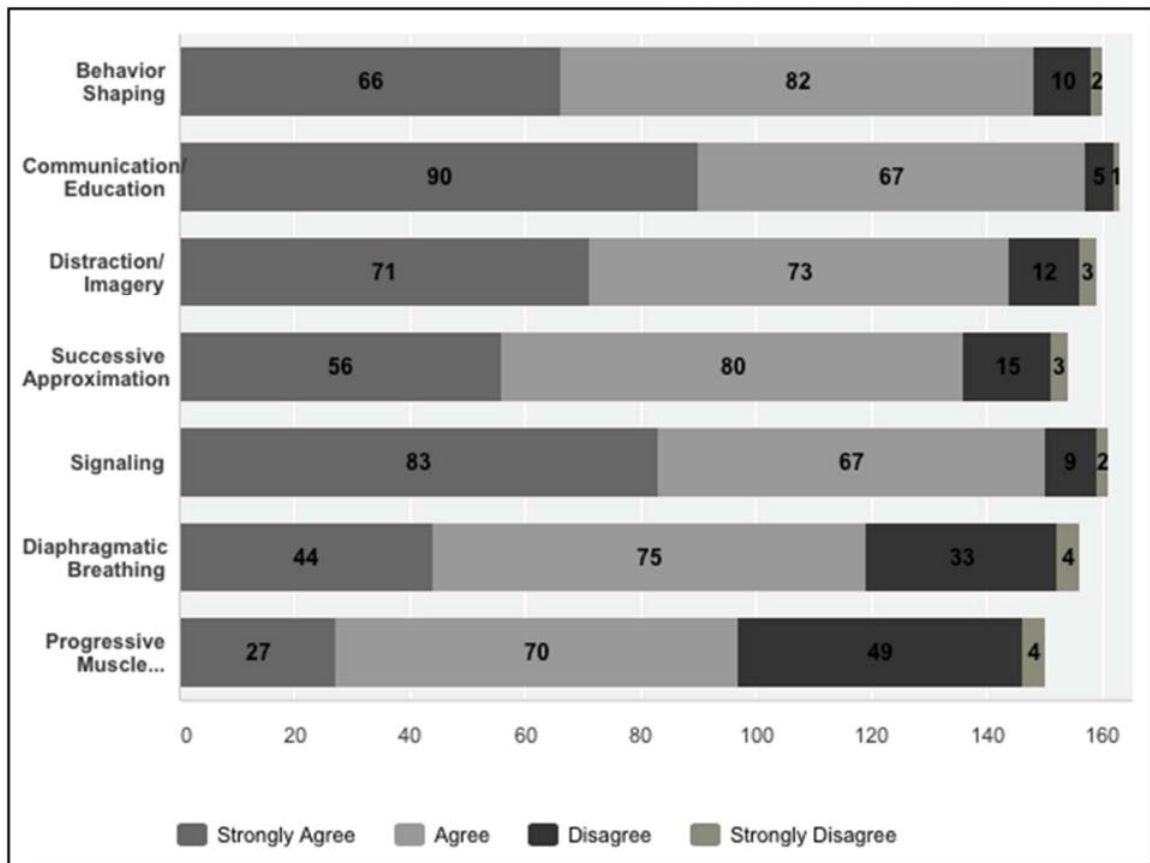
Figure 10. Survey participant believes they understand the conceptual framework of the specific BGT (Q9)
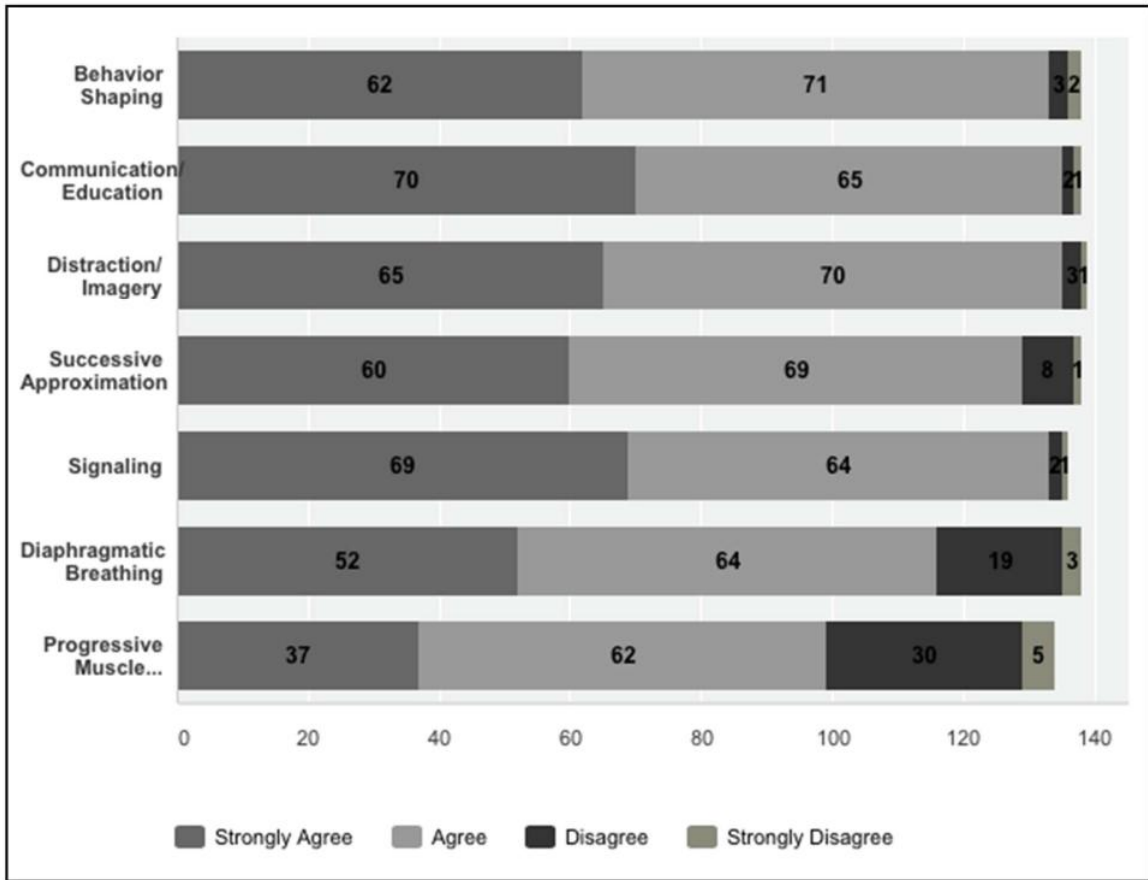
Figure 11. Survey participant believes they can provide specific examples of how to use the specific BGT (Q10)
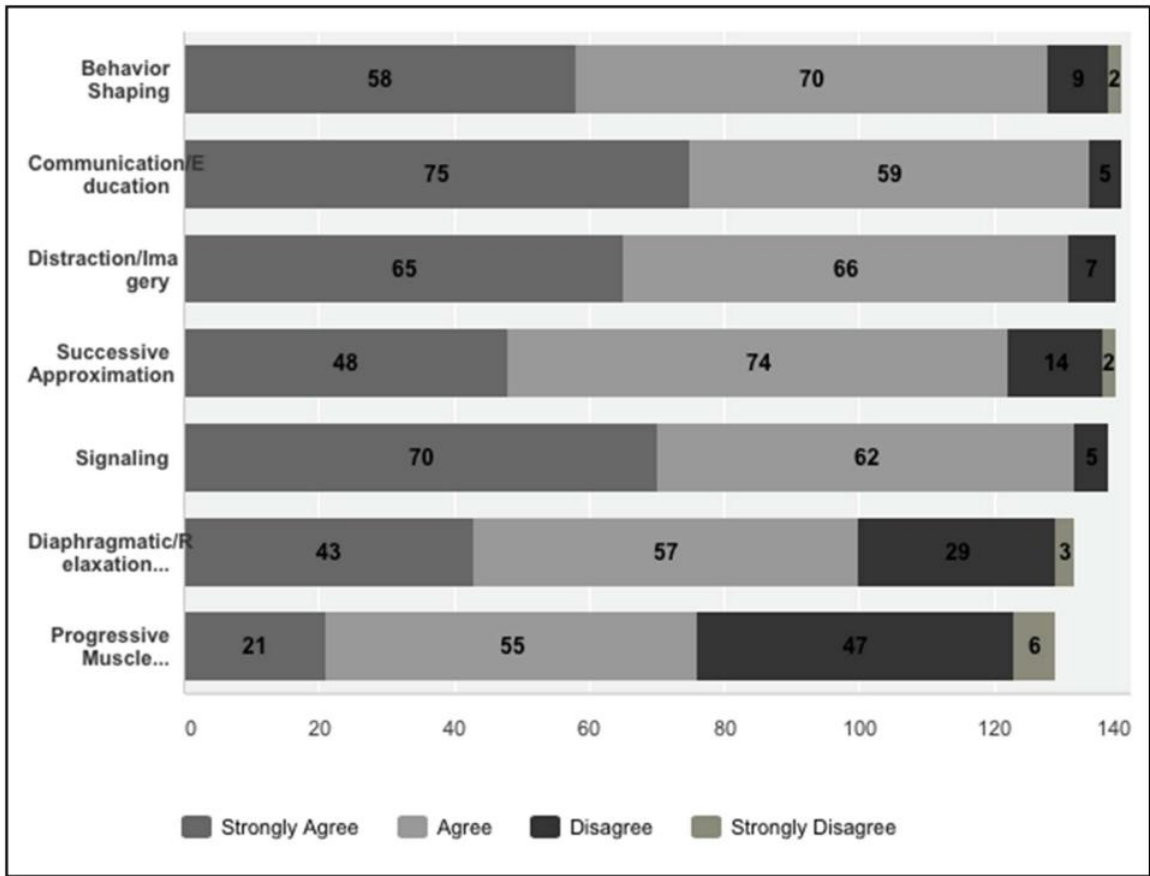
Survey participant's previous education on behavior guidance techniques were evaluated by questioning their perceived quality and quantity of education in dental school devoted to non-pharmacological management of dental fear and anxiety in the adult population (Table 8, Figure 12, Figure 13). Since this topic pertains to Aim 3, results will be discussed in the analysis section. Participants were also asked to disclose (on average) how many Continuing Education (CE) courses on DFA management they have attended in the last decade (Table 8, Figure 14).

Table 8. Previous Education on Behavior Guidance Techniques

Survey participant's education on non-pharmacological management of DFA	% (n)
Perceived quality of education during dental school (m=23) Q20	
Excellent	10.07% (14)
Good	21.58% (30)
Fair	38.85% (54)
Poor	29.50% (41)
Perceived quantity of time in dental school curriculum devoted to DFA (m=22) Q21	
Comprehensive	6.43% (9)
Sufficient	12.86% (18)
Limited	65.71% (92)
None	15.00% (21)
Quantity of Continuing Education (CE) courses attended on management of DFA (m=22) Q17	
0 Courses	37.14% (52)
1 Courses	19.29% (27)
2-4 Courses	30.71% (43)
5-7 Courses	6.43% (9)
>7 Courses	6.43% (9)

m represents the number of survey participants that skipped a particular question

Figure 12. Perceived quality of education during dental school (Q20)
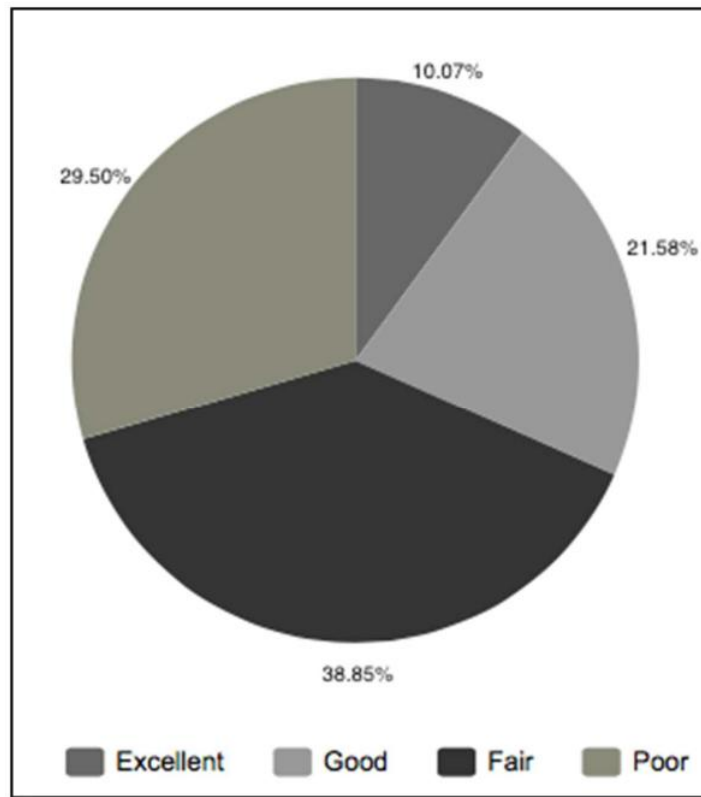
Figure 13. Perceived quantity of education during dental school (Q21)
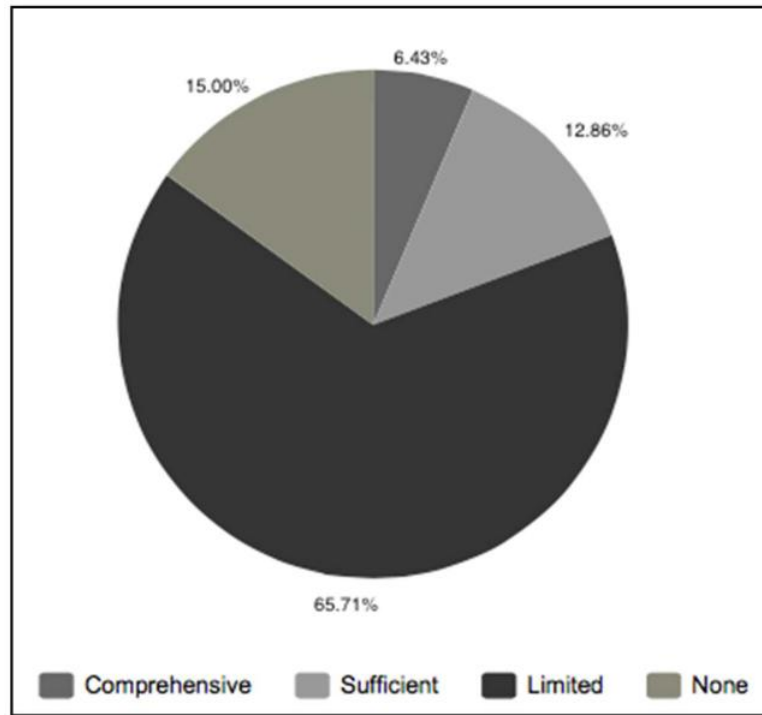
Figure 14. Quantity of (CE) courses attended in past decade (Q17)
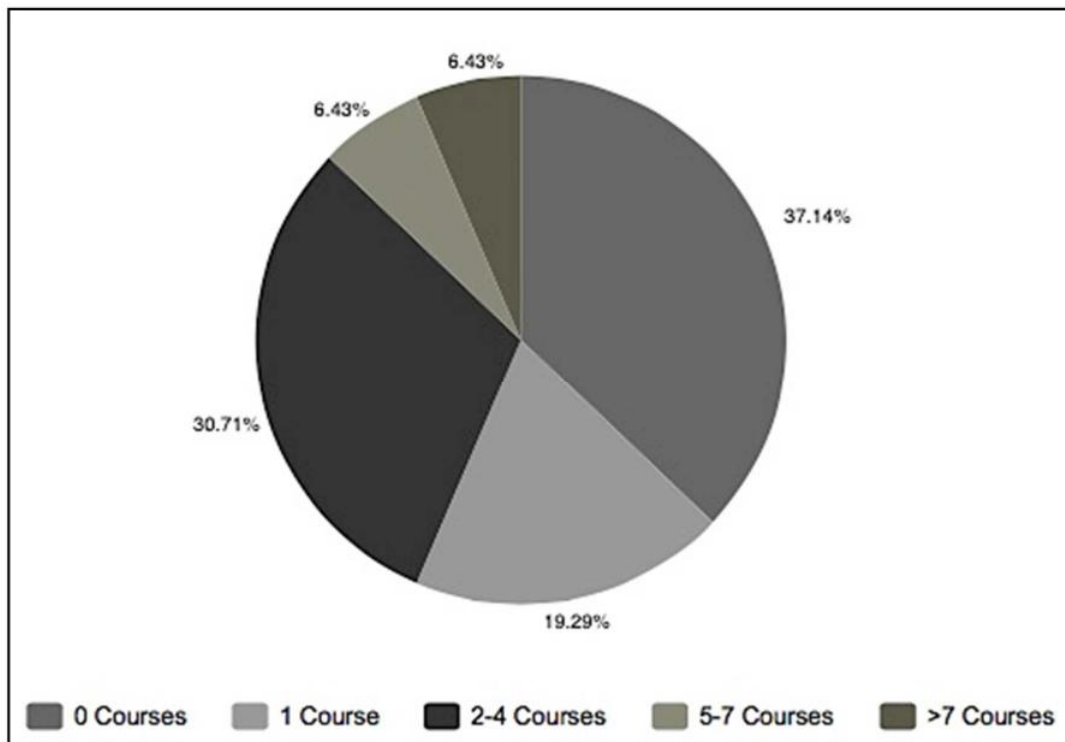
Perception of Dental Fear & Anxiety in the dental office varied amongst

practitioners and is depicted in Table 9. Some of these results are illustrated in

Figure 15-Figure 18; most will be further reviewed in the Discussion section.

Table 9. Perceived Dental Fear & Anxiety (DFA) in the Dental Office

Survey participant's perception of DFA in the dental office	% (n)
Perceived clinical skills in managing DFA (m=22) Q14	
Excellent	32.14% (45)
Good	58.57% (82)
Fair	8.57% (12)
Limited/None	0.71% (1)
Perceived quantity of adults that exhibit some degree of DFA (m=23) Q16	
<20%	28.78% (40)
20-39%	32.37% (45)
40-59%	18.71% (26)
60-80%	13.67% (19)
>80%	6.47% (9)
Belief that DFA patients improve with each subsequent visit under their care (m=24) Q22	
Strongly Agree	29.71% (41)
Agree	63.77% (88)
Disagree	5.80% (8)
Strongly Disagree	0.72% (1)
Belief that younger adults have less dental coping skills than older adults (m=22) Q18	
Strongly Agree	12.14% (17)
Agree	35.71% (51)
Disagree	48.57% (68)
Strongly Disagree	3.57% (5)
Belief that there has been a change in the rate of patients interrupting procedures (m=22) Q19	
Decreased	55.71% (78)
Stayed the Same	34.29% (48)
Increased	10.00% (14)
Level of stress experienced when treating DFA patients (m=23) Q23	
Very Stressful	24.46% (34)
Somewhat Stressful	67.63% (94)
Not at all Stressful	7.91% (11)
Level of difficulty experienced when treating DFA patients (m=22) Q24	
Very Difficult	11.68% (16)
Difficult	74.45% (102)
Easy	13.14% (18)
Very Easy	0.73% (1)

m represents the number of survey participants that skipped a particular question

Figure 15. Clinical skills in managing DFA (Q14)
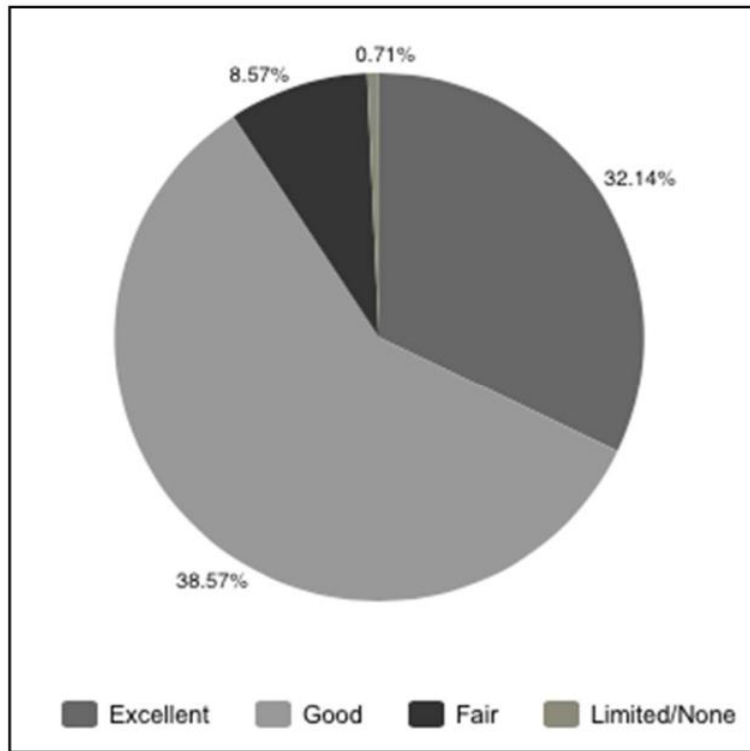
Figure 16. Perceived quantity of adults whom exhibit some degree of DFA (Q16)
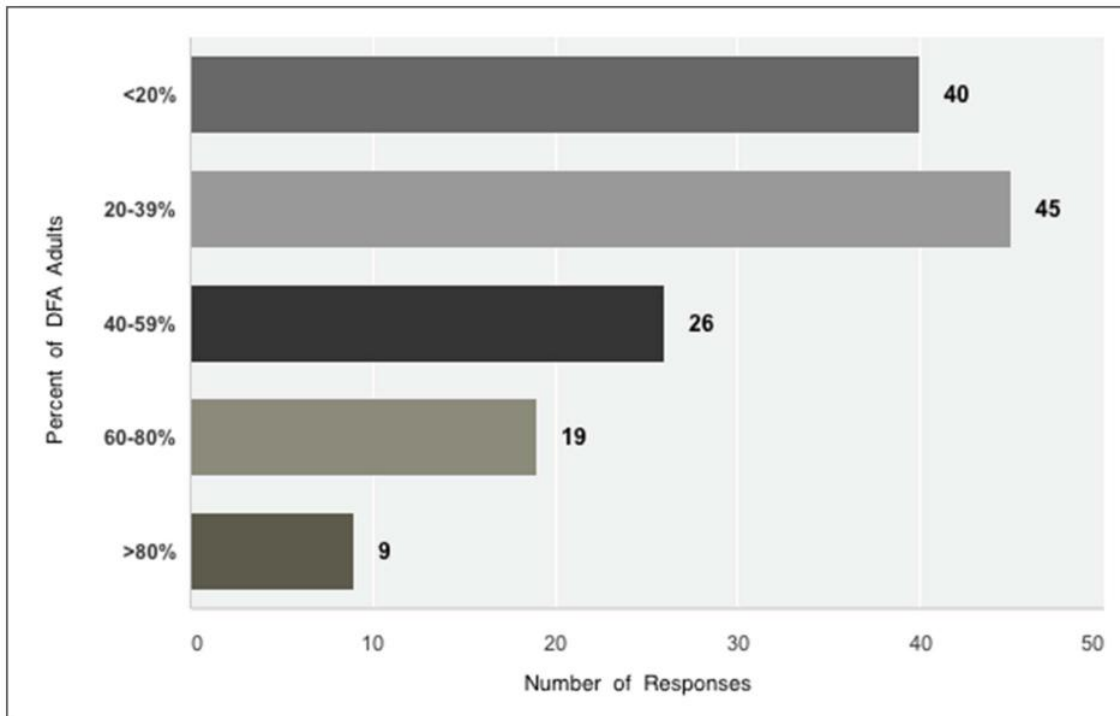
Figure 17. Level of stress experienced when treating DFA patients (Q23)
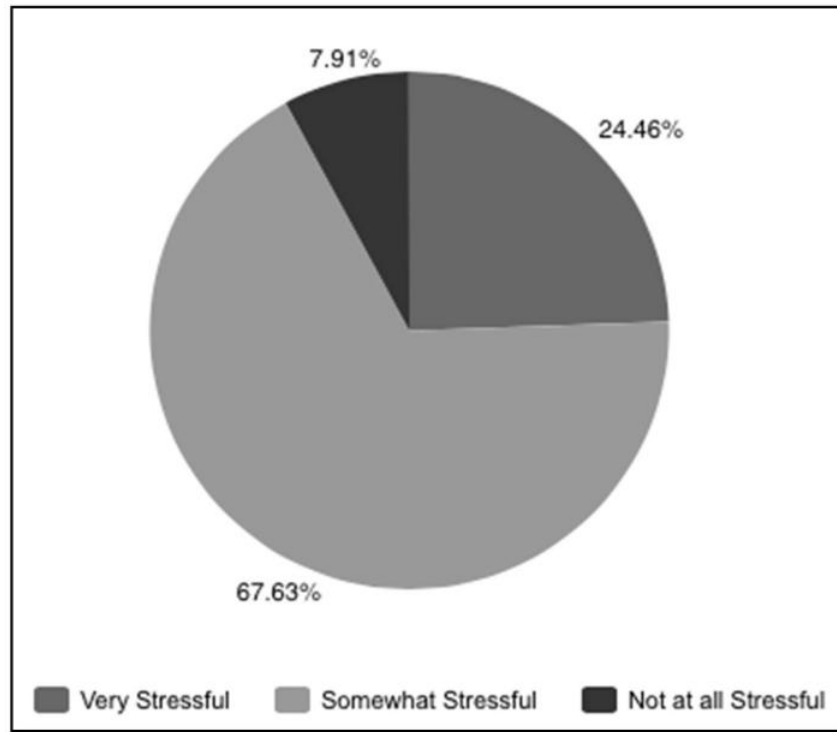
Figure 18. Level of difficulty experienced when treating DFA patients (Q24)
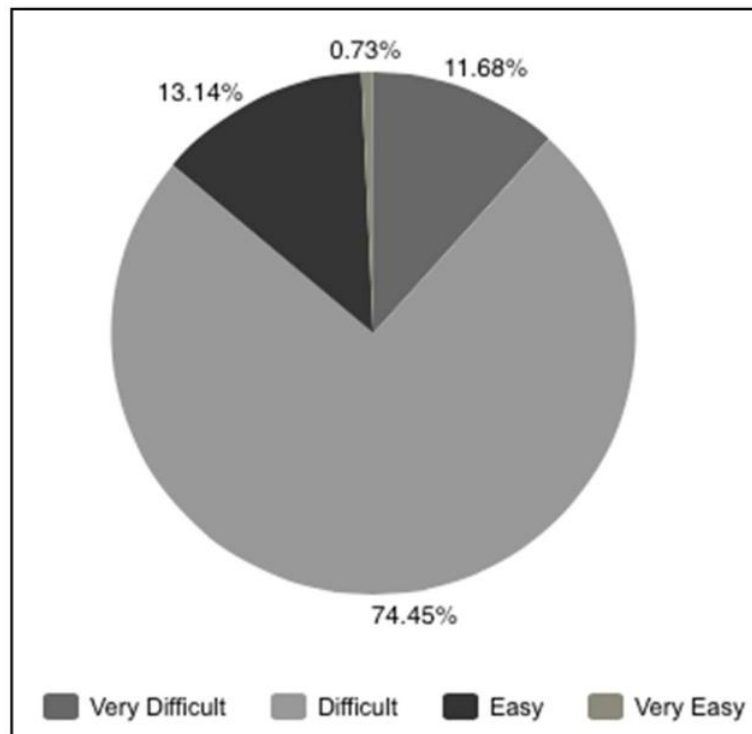
Survey participant's interests in obtaining education on behavior guidance techniques are recorded in Table 10. Figure 19 and Figure 20 illustrate the participants' interest in learning how to apply specific techniques and their preference in an instructor, accordingly.

Table 10. Future Education on Behavior Guidance Techniques

Education of behavior guidance technique (BGT)	Strongly Agree % (n)	Agree % (n)	Disagree % (n)	Strongly Disagree % (n)
Survey participant would like to learn how to effectively apply the specific BGT Q11				
Behavior Shaping (m=31)	32.58% (43)	52.27% (69)	12.88% (17)	2.27% (3)
Communication/Education (m=30)	37.59% (50)	49.62% (66)	11.28% (15)	1.50% (2)
Distraction/Imagery (m=30)	32.33% (43)	52.63% (70)	13.58% (18)	1.50% (2)
Successive Approximation (m=31)	31.82% (42)	53.79% (71)	12.88% (17)	1.52% (2)
Signaling (m=29)	34.33% (46)	52.24% (70)	11.94% (16)	1.49% (2)
Diaphragmatic Breathing… (m=30)	27.82% (37)	53.38% (71)	16.54% (22)	2.26% (3)
Progressive Muscle Relax… (m=31)	28.79% (38)	50.76% (67)	18.18% (24)	2.27% (3)
	Most Suitable % (n)	**Suitable % (n)**	**Least Suitable % (n)**	
Most suitable healthcare professional to teach course on integrating adult BGT into office Q15				
A Licensed Psychologist (m=27)	52.21% (71)	22.79% (31)	25.00% (34)	
A Pediatric Dentist (m=27)	27.94% (38)	50.74% (69)	21.32% (29)	
A General Dentist without Specialty Training (m=27)	19.85% (27)	26.47% (36)	53.68% (73)	
			% (n)	
Willingness to pay to participate in a Continuing Education (CE) course devoted to DFA…(m=23) Q25				
Yes			62.14% (87)	
No			37.86% (53)	

m represents the number of survey participants that skipped a particular question

Figure 19. Interest in learning how to effectively BGTs (Q11)
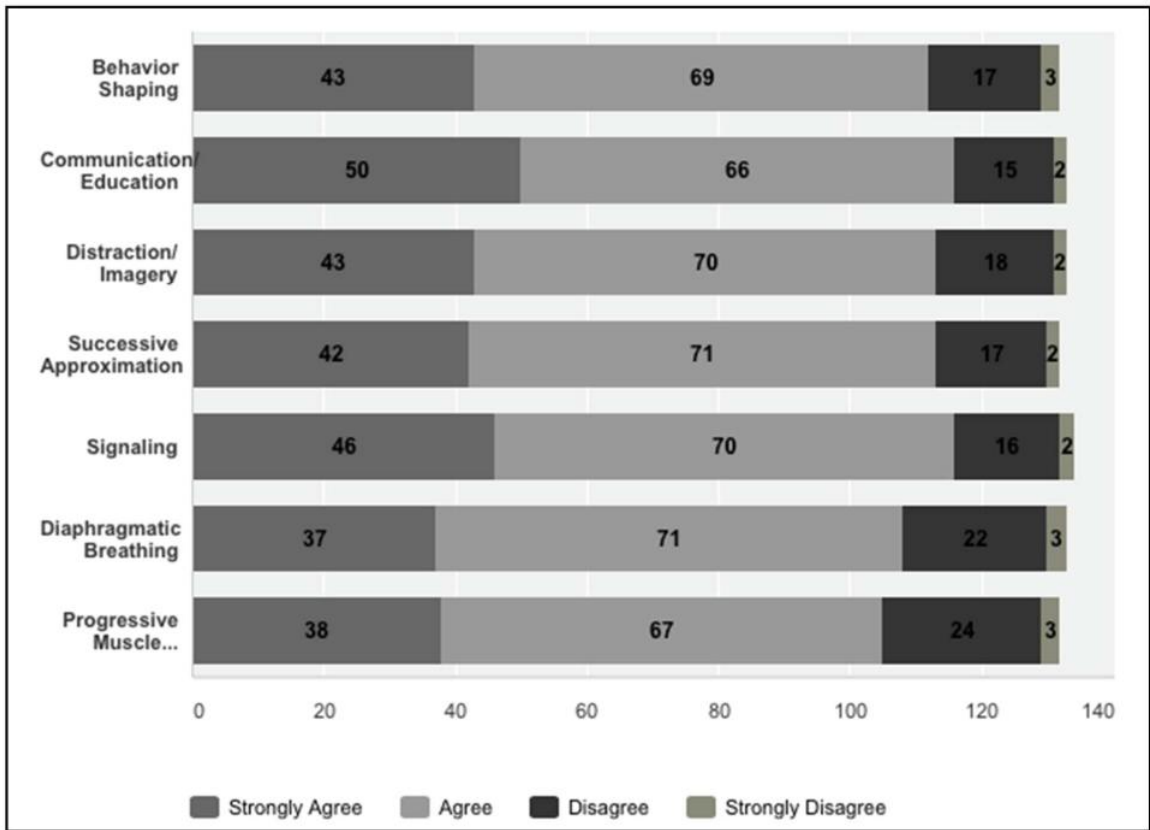
Figure 20. Preference for healthcare professional to teach DFA course (Q15)
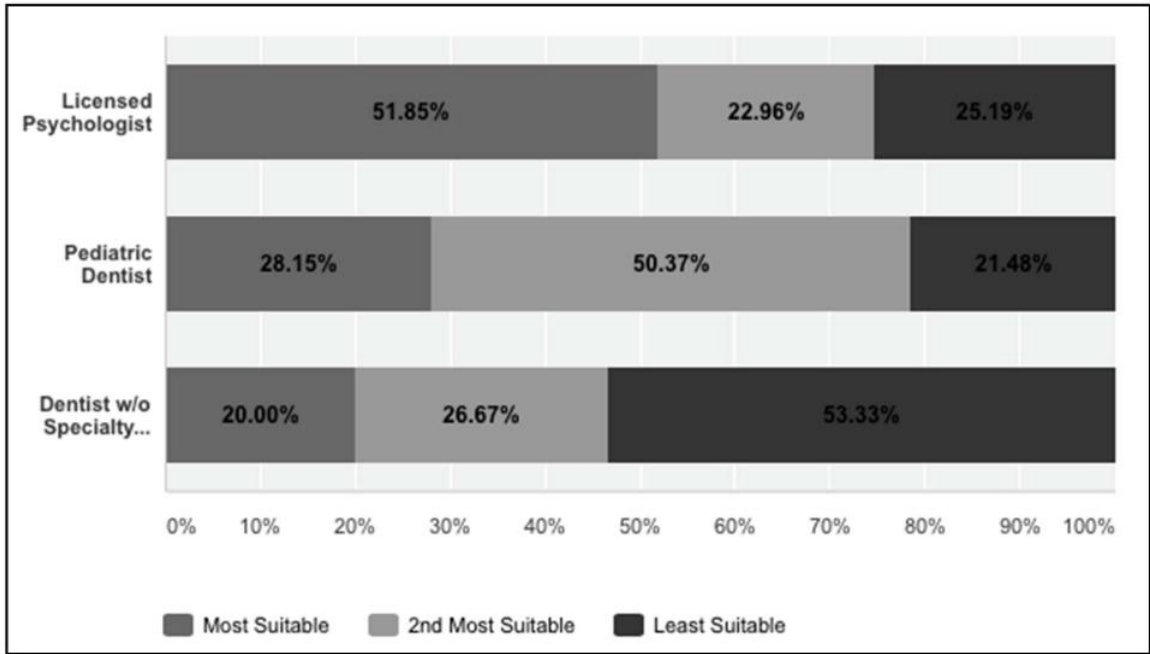
There were 15 participants that provided a total of 18 double-answers. A double-answer in this study denotes two different answers provided by a participant in response to one question. All of these double-answers were deleted prior to initiation of the analysis. In regards to the 11 (8.03%) of participants who answered "Other" as a response to question 26 (what is the extent of your dental education?); all descriptive answers were categorized into provided options. This categorization can be viewed in Table 11.

Table 11. Categorization of "Other" Responses in Question 26 (Extent of Dental Education)

	Frequency % (n)
General Dentistry Degree with Advanced Education	
(FAGD, 2000+ Hours)	0.09% (1)
(General Practice Residency- GPR)	0.09% (1)
(Geriatrics)	0.09% (1)
(Oral & Maxillofacial Surgery PGY5)	0.09% (1)
(Specialist)	0.09% (1)
General Dentistry with ADA Recognized Dental Specialty Certification	
(Endodontist)	0.09% (1)
(Endodontist + AEGD)	0.09% (1)
(Oral & Maxillofacial Surgeon)	0.18% (2)
(Periodontist)	0.09% (1)
(Prosthodontist, Geriatric Dentistry, Forensics)	0.09% (1)

All data was then coded numerically and sent to statistician for consideration of data imputation due to missing answers. Data imputation uses responses in the current data set to randomly impute values for missing data through a series of probability algorithms in order to decrease the amount of bias that would accompany the alternative choice of deletion [43]. Answers were missing due to participants either skipping a question (or a portion of a question), quitting the survey, or due to deletion as a consequence of providing a double-answer. Upon evaluation of the coded data by the principal investigator and statistician it was decided that data imputation would not be in the best interest of the study and most likely result in misrepresentation of the study population due the pattern of missing entries.

Missing observations were then deleted in a pairwise method. Which means, if the participant had a missing observation in an analyzed variable, they were dropped from the statistical test. A one-tailed z-proportion test was run to test the differences in proportion as indicated for Aim 1-Aim 4 and results are displayed in Table 12-Table 15. As previously stated, this study will define **"most dentists" as ≥75%** of the dentists surveyed.

3.3 Analyses

Table 12. Participants' Self-Perceived Ability to Effectively Apply Techniques

Aim 1	N	Agree % (n)	Disagree % (n)	P-Value
Survey participant believes they can effectively apply the specific BGT Q8				
Behavior Shaping (m=3)	160	92.5% (148)	7.5% (12)	0.000
Communication/Education (m=1)	161	96.3% (155)	3.7% (6)	0.000
Distraction/Imagery (m=4)	159	90.6% (144)	9.4% (15)	0.000
Successive Approximation (m=9)	154	88.3% (136)	11.7% (18)	0.000
Signaling (m=3)	159	93.7% (149)	6.3% (10)	0.000
Diaphragmatic Breathing/Relaxation (m=6)	156	76.3% (119)	23.7% (37)	0.782
Progressive Muscle Relaxation (m=14)	148	64.2% (95)*	35.8% (53)	0.003

* Percent of respondents that chose the Agree response is different from ≥75%
m represents the number of survey participants that skipped a particular question
Note: p-value ≤0.05 does not relate to the hypothesis; it indicates that there is a statistical difference between dichotomous groups

Table 13. Participants' Frequency of Utilization of BG Strategies

Aim 2	N	Always_Often % (n)	Seldom_Never % (n)	P-Value
Frequency at which survey participants use the specific strategy in their office Q13				
Reduction of Waiting Times (m=22)	140	95.0% (133)	5.0% (7)	0.000
Allow Patient to Listen to Music (m=22)	138	90.6% (125)	9.4% (13)	0.000
Alter Local Anesthetic Technique (m=22)	140	75.7% (106)	24.3% (34)	0.922
Divide Treatment into Several Short … (m=24)	139	74.1% (103)*	25.9% (36)	0.844
Give Patient Choices (m=22)	139	95.7% (133)	4.3% (6)	0.000
Relaxation Techniques (m=23)	140	70.7% (99)*	29.3% (41)	0.242

Thorough Explanations (m=23)	139	98.6% (137)	1.4% (2)	0.000
Question Patient on Feelings Before... (m=24)	138	86.2% (119)	(13.8% (19)	0.001
DFA Survey Instrument to identify Pt... (m=27)	135	15.6% (21)*	84.4% (114)	0.000

* Percent of respondents that chose the Agree response is different from ≥75%

m represents the number of survey participants that skipped a particular question

Note: p-value ≤0.05 does not relate to the hypothesis; it indicates that there is a statistical difference between dichotomous groups

Table 14. Participants Quality of DFA Education

Aim 3 (part 1)	N	Excellent_Good % (n)	Fair_Poor % (n)	P-Value
Perceived quality of education during dental school (m=23) Q20				
	139	31.7% (44)*	68.3%) (95)	0.000

* Percent of respondents that chose the Agree response is different from ≥75%

m represents the number of survey participants that skipped a particular question

Note: p-value ≤0.05 does not relate to the hypothesis; it indicates that there is a statistical difference between dichotomous groups

Table 15. Participants Quantity of DFA Education

Aim 3 (part 2)	N	Comprehensive_ Sufficient % (n)	Limited_ None % (n)	P-Value
Perceived quantity of time in dental school curriculum devoted to DFA (m=22) Q21				
	140	19.3% (27)*	80.7% (113)	0.000

* Percent of respondents that chose the Agree response is different from ≥75%

m represents the number of survey participants that skipped a particular question

Note: p-value ≤0.05 does not relate to the hypothesis; it indicates that there is a statistical difference between dichotomous groups

Table 16. Participants' Understanding of BGT Conceptual Framework

Aim 4	N	Agree % (n)	Disagree % (n)	P-Value
Perceived understanding of conceptual framework underlying each BGT (m=23) Q9				
Behavior Shaping (m=31)	138	96.4% (133)	5 (3.6%)	0.000
Communication/Education (m=30)	138	97.8% (135)	3 (2.2%)	0.000
Distraction/Imagery (m=30)	139	97.1% (135)	4 (2.9%)	0.000
Successive Approximation (m=31)	138	93.5% (129)	9 (6.5%)	0.000
Signaling (m=29)	136	97.8% (133)	3 (2.2%)	0.000
Diaphragmatic Breathing/Relaxation (m=30)	138	84.1% (116)	22 (15.9%)	0.000
Progressive Muscle Relaxation (m=31)	134	73.9% (99)*	35 (26.1%)	0.000

* Percent of respondents that chose the Agree response is different from ≥75%

m represents the number of survey participants that skipped a particular question

Note: p-value ≤0.05 does not relate to the hypothesis; it indicates that there is a statistical difference between dichotomous groups

Chapter 4: Discussion

4.1 Interpretation of Results

As previously mentioned, the majority of participants were male (~75%), who have been in practice for over 15 years (~80%), and have advanced education beyond their general dentistry degree (~60%). This limited the scope of the dental population that these results may be applied. The majority of dentists will refer to ≥75% of participants, as stated in the methodology section.

When evaluating awareness, the majority of dentists reported that they were familiar with the investigated behavior guidance techniques (especially Communication/Education), with exception of Progressive Muscle Relaxation (Table 5 located in 3.2). In regards to the utilization of behavior guidance, there was an overall agreement (≥75% of participants) that all techniques were appropriate to use and effective if properly trained (Table 6 located in 3.2). In regards to specific strategies, the majority of dentists deemed all were effective in their office with exception of using a DFA Survey Instrument (35.39% disagreed); however, Dividing Treatment into Several Short Sessions and Relaxation Techniques were seldom or never used by >25% of participants (Table 6 located in 3.2). Despite the 64.62% of dentists that agreed a DFA Survey Instrument is effective in their office, 67.65% report that they never use it (Table 6 located in 3.2).

Evaluation of perceived competence on the utilization and understanding of behavior guidance techniques yielded an overall agreement that dentists could

effectively apply BGT, that they understood the conceptual framework, and could provide specific example of how to use techniques, with exception of Progressive muscle relaxation across all categories (Table 7 located in 3.2). The competence and perceived clinical skill reported were surprising given the reported lack of DFA education reported by the majority of dentists (Table 8 and Table 9 located in 3.2).

4.2 Comparison with other Studies

In a similar study by Brahm et al, the study population was more evenly distributed amongst gender (~64% female) and years in practice (~57% with >15 years) [16]. Similarly, web surveys were emailed to members of a dental association in Sweden; yet they obtained a calculated response rate of 73.39% in contrast to the response rate of 3. 28% obtained in this study [16,42]. Which suggests that alternative methods may be needed in the U.S. to obtain valuable unbiased information from this population. Due to the limited variation in demographic characteristics, this study was unable to perform analyses that could potentially reproduce pattern shown in the Brahm et al. study.

Their results for dentists with >15 years in practice showed that 81.1% had received postgraduate training in dental fear, with 29.6% feeling that they received enough training, and 70.4% desiring more training [16]. This educated group also reported the highest frequency of usage and competence in non-pharmacological techniques (with exception of Tell-Show-Do) [16]. In contrast, of the dentists with 0-15 years of practice, 28.5% had received postgraduate training in dental fear, with

57.1% feeling that they received enough training, and 42.9% desiring more training [16]. This less educated group reported lower usage and competence in non-pharmacological techniques (with exception of Tell-Show-Do) and a higher usage and competence in pharmacological techniques [16].

Our study shows that 80.5% of dentists had limited to no time in dental school devoted to DFA training, 68.4% felt that their quality of DFA education was fair of poor, with 37.1% not attending any DFA CE courses over the past decade. Although this seemingly less educated group showed a desire to learn how to effectively apply BGT (84.3%), only 62.1% were willing to pay to participate in such a course. Despite limited DFA education, superficially it appears that U.S. dentist are competent with BGT with 86.2% reporting that they can effectively apply techniques, 91.5% reporting that they understand the conceptual framework, and 86.2% reporting that they can provide specific examples of how to use such techniques.

In contrast, when focusing specifically on the progressive muscle relaxation technique, 65.1% agree they can effectively use this technique, 73.9% believe they understand the conceptual framework, and 58.9% think they can provide specific examples of how to use this technique; yet, only 40.6% of participants were aware of this technique prior to reading the short definition provided at the beginning of the survey. This disharmony of only 40.6% of dentists being aware of this technique; yet, 66.0% believe they have enough of an in-depth understanding to

explain and effectively apply the technique after reading a concise definition is ludicrous and possibly discredits all responses related to self-perceived competence and ability to apply all behavior guidance techniques. Without a specific intervention that teaches these techniques, it is difficult to evaluate dentists on their competence.

Our study found that 32.1% perceived that they had excellent skills in managing DFA; yet, 92.1% experience stress and 86.1% experience difficulty while treating these patients. With so many practitioners believing their skills are excellent in DFA management, one would think the frequency of dentists who experience stress and difficulty would be much lower and more similar to those frequencies reported in a different study conducted by Brahm et al. [28]. Their study evaluated dentists' attitudes toward DFA patients. Results depicted that dentists who perceive themselves as "not so good" (8%) at treating patients with DFA report more stress (~45%), more difficulty (~50%), and are more reluctant to treat (30%) this population[28]. In contrast, those dentist who depicted themselves as "very good" (19%) at treating patients with DFA report less stress (~10%), less difficulty (~20%), and are less reluctant to treat (~4%) this population [28].

Although it is recorded in outdated literature, it is reported that 75% of U.S. adults that have some degree of DFA [25]; yet, 79.9% of our participants felt that <60% of their patients exhibited some degree of DFA, with 28.8% perceiving that <20% of their patient population exhibit DFA. This unlikely true discrepancy can be

explained by what Brahm et al. refers to as the "attention factor" [28]. The attention

factor refers to those dentists who overestimate DFA because they consider it a

concern or have experienced dental fear/discomfort themselves; or, those dentists

that underestimate the DFA population because they do not recognize the problem

and are unable to discern DFA patients [28]. Taking into consideration that

disharmony of survey answers in relation to studies that utilized logistic regression;

it can be presumed that the latter is more likely.

4.3 Interpretation of Specific Aims

4.3.1: Aim 1

Specific aim 1 was used to identify dentists' self-rated efficacy in using

behavior guidance techniques for treating patients with DFA. Results depicted in

Table 12 (located in Results 3.3) identity progressive muscle relaxation as the only

investigated behavior guidance technique that most dentists (≥75% as defined in

Methodology) have low competence in when managing DFA patients. Only 64.2% of

dentists agreed that they could effectively apply this technique.

4.3.2: Aim 2

Specific aim 2 was used to identify the prevalence of dentists' utilization of

behavior guidance strategies when managing adult patients with DFA. Results

depicted in Table 13 (located in Results 3.3) identities three strategies that most

dentists (≥75% as defined in Methodology) are not applying to manage DFA

patients.   The three strategies, which are not always or often utilized are: divide

treatment into several short sessions (utilized by 74.1%), use of relaxation

techniques (utilized by 70.7%), and use of a DFA survey instrument (utilized by

15.6%).

4.3.3: Aim 3

4.3.3.1: Aim 3 (part 1)

Specific aim 3 (part 1) was used to identify dentists' self-rated evaluation of

their quality of curriculum exposure to DFA management education they received

during dental school. Results depicted in Table 14 (located in Results 3.3) identities

that most dentists ($\geq$75% as defined in Methodology) had an insufficient quality of

education on the management of DFA with behavior guidance. Only 31.7%

perceived their quality of education was excellent or good.

4.3.3.2: Aim 3 (part 2)

Specific aim 3 (part 2) was used to identify dentists' self-rated evaluation of

their quantity of curriculum exposure to DFA management education they received

during dental school. Results depicted in Table 15 (located in Results 3.3) identities

that most dentists ($\geq$75% as defined in Methodology) had an insufficient quantity of

education on the management of DFA with behavior guidance. Only 19.3%

perceived their quantity of education was excellent or good.

Specific aim 4 was used to evaluate dentists' self-rated understanding of the

conceptual framework that underlies behavior guidance techniques to identify if

behavior guidance techniques can be properly applied. Results depicted in Table 16

(located in Results 3.3) identity progressive muscle relaxation as the only

investigated behavior guidance technique that most dentists (≥75% as defined in

Methodology) are unaware of its proper application. Only 73.9% of dentists agreed

that they understood the conceptual framework of this technique.

4.3.4.1: True Implications of Aim 4

Specific aim 4 was originally designed with the following hypothesis:

Ha: If most Dentists' surveyed do NOT Strongly Agree on their

        understanding of the conceptual framework underlying behavior

        guidance techniques, then they are not aware of proper application of

        behavior guidance techniques on DFA patients.

Data analysis for this aim was supposed to be the following:

For Aim 4:   Question #9 will be used to achieve this aim. A new

                       dummy variable will be created for question #9. Those who

                       respond to categories "strongly agree" will be categorized into

                       one group, those responding "agree" will be categorized into a

                       second group, and those responding to other 2 categories will

be categorized into a third group. A one-tailed z-proportion test will be run to test differences in proportion of dentists who agree that they understand the conceptual framework underlying behavior guidance techniques compared to those who do not.

The aim was modified after receiving the data analysis from the statistician, due to the results that were provided. The statistician split responses into dichotomous categories rather than isolating the "strongly agree" category as intended. This was considered a critical error since proper application of behavior guidance techniques require practitioners to strongly agree without any doubt that they understand the conceptual frameworks. Due to limitations with the statistician and lack of access to data after pairwise deletions occurred it was decided the best course of action was to modify the aim itself.

When evaluating the frequency data for question #9 (used to answer Aim 4), it is clear that most dentists do not strongly agree that they understand the conceptual framework of any of the behavior guidance techniques investigated, as demonstrated in Table 17 on the following page.

Table 17. Perceived Competence/Understanding of Behavior Guidance Techniques.

Perceived competence/understanding behavior guidance technique (BGT)	Strongly Agree % (n)	Agree % (n)	Disagree % (n)	Strongly Disagree % (n)
Survey participant believes they understand the conceptual framework of the specific BGT Q9				
Behavior Shaping (m=24)	44.93% (62)*	51.45% (71)	2.17% (3)	1.45% (2)
Communication/Education (m=24)	50.72% (70)*	47.10% (65)	1.45% (2)	0.72% (1)
Distraction/Imagery (m=23)	46.76% (65)*	50.36% (70)	2.16% (3)	0.72% (1)
Successive Approximation (m=24)	43.48% (60)*	50.00% (69)	5.80% (8)	0.72% (1)
Signaling (m=26)	50.74% (69)*	47.06% (64)	1.47% (2)	0.74% (1)
Diaphragmatic Breathing… (m=24)	37.68% (52)*	46.38% (64)	13.77% (19)	2.17% (3)
Progressive Muscle Relax… (m=28)	27.61% (37)*	46.27% (62)	22.39% (30)	3.73% (5)

* Percent of respondents that chose the Agree response is different from ≥75%
m represents the number of survey participants that skipped a particular question

Since the differences between the frequencies prior to and after pairwise deletion with application of the difference in proportions test are minuet across all categories of all aims, and the percent of participants who strongly agree that they understand conceptual framework of BGT range from 27.61% to 50.74%, the authors can confidently state that most dentists are unaware of the proper application of any behavior guidance techniques investigated in this study.

Considering an average of only 43.13% of dentists strongly agree that they understand the conceptual framework of behavior guidance techniques and assuming the increased likelihood that a portion of survey participants chose to complete this survey due to their active interest in behavior guidance, it is likely that this number is higher than the true dental population. Given most dentists do not

fully understand the conceptual framework and are therefore are unaware of the

proper application of techniques, their opinions of the appropriate use,

effectiveness, and ability to apply BGT is tinted by their own ignorance.

4.3.5: Overall Assessment of Aims

The results of the analysis enable us to reject all null hypotheses and accept

the alternative hypothesis for portions of every aim. Accepting the alternative

hypothesis implies that dentists do not perceive that the quality and quantity of

their behavior guidance education enables them to effectively treat adults with

Dental Fear and Anxiety (DFA) and that there is a need for additional education.

These results are biased due to the dental age of the sample in addition to apparent

ignorance in DFA education. Although the aims of this study were fulfilled, the

authors plan to continue statistical analysis of the data.

Chapter 5: Conclusion

With very limited DFA knowledge, dentists are apt to be blinded to the potential understanding, application, and success that can come with behavior guidance education and integration into the dental field. Unlike most tangible things in dentistry, the success that comes with proper utilization of behavior guidance is very unlikely to be noticed without education or vicarious condition through observation of a seasoned provider.

The "blindness" of this particular sample was revealed through the inconsistency in answers as discussed earlier in chapter 5; such as most dentists perceiving they understand the conceptual framework of techniques and can effectively apply them; yet, most experience stress, difficulty, and have very limited educational background in behavior guidance techniques. With further statistical analysis and possible application of logistic regression to number of CE courses attended on DFA in the pass decade, we expect to see patterns similar to other studies. Since the U.S. appears to have a deficit in active research and application of behavior guidance in comparison to other countries where this topic is actively being pursued, it is likely that the participants have not been exposed to the same vicarious conditioning as practitioners in other studies and therefore have a false sense of behavior guidance competence. Studies related to adult DFA and non-pharmacological management have come out of Australia [3], Germany [27], London [9,41], Singapore [23], and Sweden [6,16,24,28] from 2012-2013 alone; in comparison to the U.S.

with one study published in 2000 on dental anxiety scales by a author based out of London. Although it cannot be stated with certainty without methodology designed to perform a thorough literature review, it appears that American dental literature in the last decade related to adult DFA focuses solely on pharmacological treatment without regards to DFA recognition and alternative management strategies.

There is an enormous amount of applicable behavior science literature that could quickly enable the integration of proven strategies into the efficient work environment of the typical American dental office. Pediatric dentists will most likely continue to encounter behavior science collogues, such as applied behavior analysis therapists, through shared special health care needs patients. One alarming discrepancy noted during the process of this study was that the definition of behavior shaping and positive reinforcement very different in the literature depending on which field they are being referenced [2,3,44]. If dentistry is going to progress to incorporate increased behavior sciences, we need to adapt to the world of our behavior sciences collogues and share the same definitions and meaning when referring to behavior guidance vocabulary.

The progression in this endeavor will be: to create a study that isolates a limited number of significant variables from the current study with distribution through a different conduit outside of the medical marketing agency (MMS Lists);

followed by, a study that tests graduating dental students on their behavior

guidance knowledge rather than self-perceived knowledge or clinical abilities; and

lastly, a study with intervention to evaluate the effects of behavioral guidance

education on the average dentist.

The purpose of this study was to investigate the dentists' skills in treating

dental fear and anxiety (DFA) in adult patients, current strategies used in practice to

treat these patients, and to explore the need for additional education. It was

intended to gather information that may be used to advocate for increased

behavioral sciences integration into dentistry that could directly benefit the

pediatric population by easing transition to other dental specialists or into adult

dental care and reducing vertical transmission from caregivers.

The results of this study gathered sufficient information to validate that there

is a need to advocate for increased behavioral sciences integration into dentistry.

With limited modern literature this study also implicates that there is a need to

invest into well-designed studies that prove not only that there is a behavior

guidance deficit in our U.S. dentist population, but the benefits that accompany a

knowledgeable provider in this field. Education in behavior sciences will be very

difficult to sell to the mundane dentist without sufficient exposure through dental

school or proper marketing of the economic and efficiency benefits that can

accompany integration into any dental office.

APPENDICES

Appendix A: Raw Data

<u>First 40 Entries Only:</u>

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	RespondentID	CollectorID	StartDate	EndDate	IP Address	uate from a U.S. accre... dentistry 2 or m treat Adult p with pharm iliar with each of the following behavior guidance techniques?											
2						Response	Year (YYYY)	Response	Response	Response	or Shaping	or Shapication/Education/Ed	tion/Imagen	tion/Image e	Approxima		
3	3788110827	63233886	02/23/2015	02/24/2015	108.2.211.54	Year (YYYY)	1982	Yes	Yes	No	Yes		Yes		Yes		Yes
4	3770614624	63233886	02/18/2015	02/18/2015	166.170.36.208	Year (YYYY)	1983	Yes	Yes	No		No	Yes		Yes		Yes
5	3767079089	63233886	02/17/2015	02/17/2015	38.78.208.2	Year (YYYY)	2003	Yes	Yes	Yes		No	Yes		Yes		
6	3766712000	63233886	02/17/2015	02/17/2015	68.238.208.50	Year (YYYY)	2005	Yes	Yes	No		No	Yes		Yes		
7	3765589046	63233886	02/16/2015	02/16/2015	68.115.56.170	Year (YYYY)	1984	Yes	Yes	No	Yes		Yes		Yes		Yes
8	3765570529	63233886	02/16/2015	02/16/2015	96.41.200.219	Year (YYYY)	1975	Yes	Yes	No	Yes		Yes		Yes		Yes
9	3765009978	63233886	02/16/2015	02/16/2015	99.36.37.150	Year (YYYY)	1973	Yes	Yes	No	Yes		Yes		Yes		Yes
10	3764597855	63233886	02/16/2015	02/16/2015	71.246.80.219	Year (YYYY)	1971	Yes	Yes	Yes							
11	3763418477	63233886	02/15/2015	02/15/2015	64.107.171.66	Year (YYYY)	1984	Yes	Yes	No	Yes		Yes		Yes		Yes
12	3763077120	63233886	02/15/2015	02/15/2015	72.69.209.214	Year (YYYY)	2006	Yes	Yes	No							
13	3762464094	63233886	02/15/2015	02/15/2015	166.170.20.115	Year (YYYY)	1973	Yes	Yes	Yes	Yes		Yes		Yes		Yes
14	3762422397	63233886	02/15/2015	02/15/2015	209.0.141.91	Year (YYYY)	2003	Yes	Yes	No	Yes		Yes		Yes		Yes
15	3762287988	63233886	02/14/2015	02/14/2015	70.176.71.182	Year (YYYY)	1986	Yes	Yes	Yes	Yes		Yes		Yes		Yes
16	3761871253	63233886	02/14/2015	02/14/2015	67.80.18.19	Year (YYYY)	1992	Yes	Yes	No		No	Yes			No	
17	3761615286	63233886	02/14/2015	02/14/2015	98.144.115.179	Year (YYYY)	1976	Yes	Yes	Yes	Yes		Yes			No	Yes
18	3761491767	63233886	02/14/2015	02/14/2015	73.166.181.24	Year (YYYY)	1993	Yes	Yes	No	Yes		Yes		Yes		Yes
19	3761139981	63233886	02/14/2015	02/14/2015	75.27.96.47	Year (YYYY)	1971	Yes	Yes	No							
20	3760934434	63233886	02/14/2015	02/14/2015	108.56.71.38	Year (YYYY)	2004	Yes	Yes	No	Yes		Yes		Yes		Yes
21	3760612544	63233886	02/14/2015	02/14/2015	73.23.250.222	Year (YYYY)	1964	Yes	Yes	No		No	Yes		Yes		Yes
22	3760389224	63233886	02/13/2015	02/13/2015	68.187.190.15	Year (YYYY)	1988	Yes	Yes	No	Yes		Yes		Yes		
23	3759924864	63233886	02/13/2015	02/13/2015	99.186.235.110	Year (YYYY)	1992	Yes	Yes	No	Yes		Yes		Yes		Yes
24	3759793485	63233886	02/13/2015	02/13/2015	68.96.94.93	Year (YYYY)	2002	Yes	Yes	No	Yes		Yes		Yes		Yes
25	3759235400	63233886	02/13/2015	02/13/2015	70.175.174.248	Year (YYYY)	2001	Yes	Yes	Yes	Yes		Yes		Yes		Yes
26	3759198079	63233886	02/13/2015	02/13/2015	68.36.130.63	Year (YYYY)	1999	Yes	Yes	No							
27	3759115503	63233886	02/13/2015	02/13/2015	70.193.36.97	Year (YYYY)	1979	Yes	Yes	No	Yes		Yes		Yes		
28	3759030402	63233886	02/13/2015	02/13/2015	107.107.60.133	Year (YYYY)	2006	Yes	Yes	No							
29	3758916817	63233886	02/13/2015	02/13/2015	67.76.116.56	Year (YYYY)	1992	Yes	Yes	No	Yes		Yes		Yes		Yes
30	3758835683	63233886	02/13/2015	02/13/2015	24.74.7.66	Year (YYYY)	1979	Yes	Yes	No							
31	3758712617	63233886	02/13/2015	02/13/2015	50.200.61.86	Year (YYYY)	2013	Yes	Yes	No	Yes		Yes		Yes		Yes
32	3757947585	63233886	02/13/2015	02/13/2015	67.40.153.154	Year (YYYY)	1986	Yes	Yes	No							
33	3757841834	63233886	02/13/2015	02/13/2015	68.83.146.234	Year (YYYY)	1992	Yes	Yes	No	Yes		Yes		Yes		Yes
34	3757584103	63233886	02/13/2015	02/13/2015	96.228.30.223	Year (YYYY)	1973	Yes	Yes	No							
35	3757572210	63233886	02/13/2015	02/13/2015	71.206.102.35	Year (YYYY)	1985	Yes	Yes	Yes							
36	3757525347	63233886	02/13/2015	02/13/2015	108.46.112.237	Year (YYYY)	1984	Yes	Yes	No	Yes		Yes		Yes		Yes
37	3757301530	63233886	02/12/2015	02/12/2015	184.158.65.155	Year (YYYY)	1983	Yes	Yes	No	Yes		Yes		Yes		Yes
38	3757065195	63233886	02/12/2015	02/12/2015	70.89.96.185	Year (YYYY)	2005	Yes	Yes	Yes							
39	3756717652	63233886	02/12/2015	02/12/2015	64.169.79.229	Year (YYYY)	1996	Yes	Yes	No	Yes		Yes		Yes		
40	3756679618	63233886	02/12/2015	02/12/2015	98.191.4.7	Year (YYYY)	1983	Yes	Yes	No							

	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
1	The following behavior guidance techniques are appropriate to use when treating adults with Dental Fear and Anxiety (DFA).																
2	ve Approximi	gnaling - Ye	gnaling - N	Relaxation I	Relaxation	Muscle Rel	Muscle Re	haping - Str	cor Shaping	-r Shaping -	ping - Stror	Education	ation/Education/Educati	ducation -	magery - S	trion/Imagery		
3		Yes		Yes		Yes		Strongly Agree				Strongly Agree			Strongly Agree		
4		Yes		Yes	No	Yes			Agree				Agree			Agree	
5	No	Yes		Yes		Yes			Agree				Agree			Agree	
6	No		No		No		No	trongly Agree				Strongly Agree			Strongly Agree		
7		Yes		Yes			No		Agree				Agree			Agree	
8		Yes		Yes		Yes			Agree				Agree			Agree	
9		Yes		Yes			No	trongly Agree				Strongly Agree			Strongly Agree		
10																	
11		Yes		Yes		Yes		Strongly Agree				Strongly Agree			Strongly Agree		
12																	
13		Yes		Yes		Yes		Strongly Agree				Strongly Agree					
14		Yes		Yes			No	trongly Agree				Strongly Agree			Strongly Agree		
15		Yes		Yes		Yes			Agree				Agree			Agree	
16	No	Yes			No		No	trongly Agree				Strongly Agree				Agree	
17		Yes			No		No		Agree				Agree			Agree	
18		Yes			No		No		Agree				Agree			Agree	
19																	
20		Yes			No		No	trongly Agree				Strongly Agree			Strongly Agree		
21		Yes		Yes			No		Agree				Agree			Agree	
22	No			Yes			No		Agree			Strongly Agree			Strongly Agree		
23		Yes		Yes		Yes		Strongly Agree				Strongly Agree			Strongly Agree		
24		Yes		Yes		Yes			Agree				Agree			Agree	
25		Yes		Yes			No	trongly Agree				Strongly Agree			Strongly Agree		
26																	
27	No	Yes			No		No	trongly Agree				Strongly Agree			Strongly Agree		
28																	
29		Yes		Yes		Yes		Strongly Agree				Strongly Agree			Strongly Agree		
30																	
31		Yes		Yes			No	trongly Agree				Strongly Agree			Strongly Agree		
32																	
33		Yes		Yes			No	trongly Agree				Strongly Agree			Strongly Agree		
34																	
35																	
36		Yes			No		No		Agree				Agree			Agree	
37					No		No			Disagree			Agree			Agree	
38																	
39	No	Yes		Yes			No		Agree				Agree			Agree	
40																	

85

Table 1 (columns AI–AZ)

Row	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ
1													If properly trained, the following behavior guidance techniques <span style="text-deco					
2	n/Imagery -	agery - Stro	roximation -	Approximat	Approximatc	ximation -	Eng - Strongh	naling -	Agnaling - Disag	- Strongly	Ixation Breat	Relaxation	Eelaxation Bration	Breathile	Relaxatio Auscle	Relauscle Relaxa	Relaxation	
3			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			
4				Agree				Agree					Agree				Agree	
5				Agree				Agree					Agree				Agree	
6			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			
7				Agree				Agree			Strongly Agree				Strongly Agree			
8				Agree				Agree					Agree				Agree	
9			Strongly Agree				Strongly Agree				Strongly Agree							S
10																		
11			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
12																		
13		Strongly Disagree				Strongly Disag	trongly Agree				Strongly Agree				Strongly Agree			
14			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
15				Agree				Agree					Agree				Agree	
16				Agree			Strongly Agree						Agree				Agree	
17				Agree				Agree					Agree				Agree	
18				Agree				Agree					Agree				Agree	
19																		
20			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
21				Agree				Agree					Agree				Agree	
22								Agree			Strongly Agree							S
23			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
24				Agree				Agree					Agree				Agree	
25			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
26																		
27				Agree				Agree					Agree				Agree	S
28																		
29			Strongly Agree				Strongly Agree				Strongly Agree						Agree	S
30																		
31			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			
32																		
33			Strongly Agree				Strongly Agree						Disagree				Disagree	S
34																		
35																		
36				Agree				Agree					Disagree				Disagree	
37				Agree				Agree										
38																		
39				Agree				Agree					Agree			Agree		
40																		

Table 2 (columns BA–BS)

Row	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS
1	oration: underline;">are effective when treating adults with Dental Fear and Anxiety (DFA).																		
2	haping - Strror	Shaping -r	Shaping -	Eaping -	Stror/Education	-ation/Education	/Educatic	Education -	Imagery -	Strion/Imagery	n/Imagery -	agery - Stro	roximation -	Approximat	Approximatc	ximation -	Eng - Strongh	naling -	Agnaling - Disac
3		Agree			Strongly Agree				Strongly Agree					Agree				Agree	
4		Agree				Agree				Agree					Disagree			Agree	
5		Agree				Agree				Agree					Disagree			Agree	
6		Agree			Strongly Agree				Strongly Agree					Agree			Strongly Agree		
7		Agree				Agree				Agree				Agree				Agree	
8		Agree				Agree				Agree				Agree				Agree	
9	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree		
10																			
11	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree		
12																			
13			Disagree			Disagree					Disagree				Disagree				Disagree
14	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree		
15		Agree				Agree				Agree				Agree				Agree	
16		Agree			Strongly Agree					Agree				Strongly Agree				Strongly Agree	
17		Agree				Agree								Agree				Agree	
18																			
19																			
20	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree		
21		Agree				Agree				Agree				Agree				Agree	
22	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree		
23	trongly Agree				Strongly Agree				Strongly Agree					Agree				Strongly Agree	
24		Agree				Agree				Agree				Agree				Agree	
25	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree		
26																			
27	trongly Agree				Strongly Agree				Strongly Agree					Agree				Agree	
28																			
29	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree		
30																			
31		Agree			Strongly Agree				Strongly Agree					Agree				Strongly Agree	
32																			
33	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree		
34																			
35																			
36		Agree				Agree				Agree				Agree				Agree	
37			Disagree			Agree				Agree				Agree				Agree	
38																			
39		Agree				Agree				Agree				Agree				Agree	
40																			

Section 1 (columns BT–CL)

Row 1: You can effectively apply each of the following behavior guidance techniques when you treat adults with Dental Fear and Anxiety (DFA).

Row 2 (headers): g - Strongly | Ixation Breat | Relaxation | Relaxation | Bration Breathil | Relaxatio | Muscle Relaxa | uscle Relaxa | Relaxation | haping - Stror | Shaping | -r Shaping | -ping - Stror | Education/Educatio | ation/Educatio | Educatio | Education - Imagery | Strion/Imagery

#	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL
3			Agree				Agree			Strongly Agree				Strongly Agree				Strongly Agree	
4				Disagree				Disagree			Agree				Agree				Agree
5				Disagree			Agree				Agree				Agree				Agree
6			Agree				Agree				Agree			Strongly Agree				Strongly Agree	
7		Strongly Agree				Strongly Agree					Agree				Agree				Agree
8			Agree				Agree				Agree				Agree				Agree
9		Strongly Agree								Strongly Agree				Strongly Agree				Strongly Agree	
10																			
11		Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree	
12																			
13				Disagree				Disagree					Strongly Disagree				Strongly Disagree		
14		Strongly Agree				Strongly Agree					Agree				Agree			Strongly Agree	
15			Agree				Agree				Agree				Agree				Agree
16			Agree				Agree				Agree			Strongly Agree					Agree
17											Agree				Agree				
18											Agree			Strongly Agree					Agree
19																			
20		Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree	
21			Agree				Agree					Disagree			Agree				Agree
22		Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree	
23			Agree				Agree			Strongly Agree				Strongly Agree				Strongly Agree	
24			Agree				Agree				Agree				Agree				Agree
25		Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree	
26																			
27			Agree				Agree			Strongly Agree				Strongly Agree				Strongly Agree	
28																			
29		Strongly Agre	Agree				Agree			Strongly Agree				Strongly Agree				Strongly Agree	
30																			
31		Strongly Agree					Agree				Agree			Strongly Agree				Strongly Agree	
32																			
33				Disagree				Disagree		Strongly Agree				Strongly Agree					Agree
34																			
35																			
36				Disagree				Disagree			Agree			Strongly Agree					Agree
37											Agree				Agree				Agree
38																			
39			Agree				Agree				Agree				Agree				Agree
40																			

Section 2 (columns CM–DE)

Row 1: You understand the conceptual framework underlying each

Row 2 (headers): n/Imagery - agery - Stror | oximation – Approximat | Approximatic | oximation - Sng - Strongl | ynaling - Agnaling - Disag - Strongly | kation Breat | Relaxation B | laxation Brotion Breathil | Relaxatio | Muscle Relaxa | uscle Relaxa | Relaxation haping - Stro

#	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE
3			Strongly Agree				Strongly Agree					Agree				Agree			Strongly Agree
4				Agree			Strongly Agree					Agree				Agree			
5				Agree				Agree				Agree					Disagree		
6				Agree			Strongly Agree					Agree				Agree			Strongly Agree
7				Agree				Agree			Strongly Agree				Strongly Agree				
8				Agree				Agree				Agree							
9			Strongly Agree				Strongly Agree				Strongly Agree								
10																			
11			Strongly Agree				Agree					Agree				Agree			Strongly Agree
12																			
13	Strongly Disagree					Strongly Disagree			Strongly Disagree				Strongly Disagree				Strongly Disagree		
14			Strongly Agree				Strongly Agree					Agree				Agree			Strongly Agree
15				Agree				Agree				Agree				Agree			
16			Strongly Agree				Strongly Agree					Agree				Agree			
17	Disagree			Agree				Agree					Disagree				Disagree		
18				Agree				Agree				Agree				Agree			
19																			
20				Agree			Strongly Agree					Agree				Agree			Strongly Agree
21				Agree				Agree					Disagree				Disagree		
22			Strongly Agree				Strongly Agree				Strongly Agree			Strongly Agree					
23			Strongly Agree				Strongly Agree				Strongly Agree			Strongly Agree				Strongly Agree
24				Agree				Agree				Agree				Agree			
25			Strongly Agree				Strongly Agree				Strongly Agree			Strongly Agree				Strongly Agree
26																			
27			Agree				Agree					Agree				Agree			Strongly Agree
28																			
29			Strongly Agree				Strongly Agree				Strongly Agree					Agree			
30																			
31			Agree				Strongly Agree				Strongly Agree						Disagree		Strongly Agree
32																			
33			Strongly Agree				Strongly Agree					Disagree					Disagree		
34																			
35																			
36			Strongly Agree				Agree					Disagree					Disagree		
37				Agree				Agree						Strongly Disagree			Strongly Disagree		
38																			
39				Agree				Agree				Agree				Agree			
40																			

Section 3 (columns DF–DX)

Row 1: of the following behavior guidance techniques.

Row 2 (headers): or Shaping -r Shaping - Lsping - Stror | Education ation/Education/Educatic | Education - Imagery - Strion/Imagery | n/Imagery - agery - Stror | oximation - Approximat | Approximatic | oximation - Sng - Strongl | ynaling - Agnaling - Disag - Strongly

#	DF	DG	DH	DI	DJ	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX
3	e			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			St
4	Agree				Agree				Agree				Agree				Agree		
5		Disagree			Agree				Agree					Disagree		Strongly Agree			
6	e			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			
7	Agree				Agree			Strongly Agree				Strongly Agree					Agree		
8	Agree				Agree				Agree				Agree				Agree		
9	Agree				Agree				Agree				Agree				Agree		
10																			
11	e			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			St
12																			
13			Strongly Disagree				Strongly Disagree				Strongly Disagree				Strongly Disagree				Strongly Disagre
14	e			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			St
15	Agree				Agree				Agree				Agree				Agree		
16	Agree			Strongly Agree					Agree				Strongly Agree				Strongly Agree		
17	Agree				Agree					Disagree			Agree				Agree		
18																			
19																			
20	e			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			St
21	Agree				Agree				Agree				Agree				Agree		
22	Agree				Agree				Agree				Agree				Agree		
23	e			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			St
24	Agree				Agree				Agree				Agree				Agree		
25	e			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			St
26																			
27	e			Strongly Agree				Strongly Agree					Agree				Agree		
28																			
29	Agree				Agree				Agree				Agree				Agree		
30																			
31	e			Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			St
32																			
33																			
34																			
35																			
36																			
37	Agree				Agree				Agree				Agree				Agree		
38																			
39	Agree				Agree				Agree				Agree				Agree		
40																			

Table 1 (columns DY–ER): You are able to provide specific examples of how to use each of the following techniques in everyday practice.

#	DY	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	EN	EO	EP	EQ	ER
3	trongly Agree				Strongly Agree					Agree				Agree				Agree		
4		Agree				Agree								Agree						
5		Agree					Disagree				Disagree		Strongly Agree							
6		Agree				Agree			Strongly Agree				Strongly Agree				Strongly Agree			
7		Agree				Agree					Disagree			Agree			Strongly Agree			S
8		Agree				Agree				Agree				Agree				Agree		
9		Agree						Strongly Disagree		Agree				Agree				Agree		
11	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
13	ree			Strongly Disagree				Strongly Disagree		Disagree					Disagree				Disagree	
14	trongly Agree					Agree				Agree			Strongly Agree				Strongly Agree			S
15		Agree				Agree				Agree			Strongly Agree	Agree				Agree		
16			Disagree				Disagree		Strongly Agree				Strongly Agree					Agree		S
17			Disagree				Disagree			Agree				Agree					Disagree	
20	trongly Agree				Strongly Agree						Disagree		Strongly Agree					Agree		
21		Agree				Agree				Agree				Agree				Agree		
22		Agree				Agree				Agree				Agree				Agree		
23	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
24		Agree				Agree				Agree				Agree				Agree		
25	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
27		Agree				Agree			Strongly Agree				Strongly Agree				Strongly Agree			
29		Agree				Agree			Strongly Agree				Strongly Agree				Strongly Agree			S
31	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
37				Strongly Disagree				Strongly Disagree		Agree			Strongly Agree				Strongly Agree			S
39		Agree				Agree				Agree				Agree				Agree		

Table 2 (columns ES–FL): You would like to learn how to effectively apply each of the following behavior guidance techniques in yo[ur]

#	ES	ET	EU	EV	EW	EX	EY	EZ	FA	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL
3		Agree				Agree				Agree				Agree	Strongly Agree					S
4		Agree				Agree				Agree				Agree					Disagree	
5			Disagree		Strongly Agree					Agree				Agree				Agree		
6		Agree			Strongly Agree						Disagree			Strongly Agree	Disagree		Strongly Agree			S
7	trongly Agree					Agree			Strongly Agree					Strongly Agree	Strongly Agree					S
8		Agree				Agree				Agree				Agree					Disagree	
9		Agree				Agree				Agree						Strongly Disagree		Agree		
11	trongly Agree				Strongly Agree				Strongly Agree					Strongly Agree				Agree		
13			Disagree				Disagree				Disagree				Disagree					Strongly Disag
14	trongly Agree				Strongly Agree				Strongly Agree						Disagree		Strongly Agree			S
15		Agree				Agree				Agree				Agree					Disagree	
16	trongly Agree				Strongly Agree						Disagree				Disagree			Agree		
17		Agree				Agree					Disagree							Agree		
20		Agree			Strongly Agree				Strongly Agree						Disagree			Agree		S
21		Agree				Agree					Agree			Agree					Disagree	
22		Agree				Agree					Agree			Agree			Strongly Agree			S
23	trongly Agree				Strongly Agree				Strongly Agree					Strongly Agree			Strongly Agree			S
24		Agree				Agree				Agree				Agree				Agree		
25	trongly Agree				Strongly Agree				Strongly Agree					Strongly Agree					Disagree
27		Agree				Agree				Agree				Agree			Strongly Agree			S
29	trongly Agree				Strongly Agree				Strongly Agree					Strongly Agree			Strongly Agree			S
31	trongly Agree				Strongly Agree				Strongly Agree					Disagree			Agree		
37	trongly Agree				Strongly Agree													Agree		
39		Agree				Agree				Agree				Agree				Agree		

Table 3 (columns FM–GF): ur dental practice. · Do you agree or d

#	FM	FN	FO	FP	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB	GC	GD	GE	GF
3	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
4		Agree				Agree				Agree				Agree				Agree		
5		Agree				Agree				Agree				Agree				Agree		
6	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
7	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
8			Disagree				Disagree				Disagree				Disagree				Disagree	
9		Agree				Agree				Agree				Agree				Agree		
11		Agree				Agree				Agree				Agree				Agree		
13	ree		Strongly Disagree				Strongly Disagree				Strongly Disagree				Strongly Disagree				Strongly Disagr
14	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
15			Disagree				Disagree				Disagree				Disagree				Disagree	
16		Agree				Agree				Agree				Agree				Agree		
17		Agree				Agree				Agree				Agree				Agree		
20	trongly Agree				Strongly Agree					Agree			Strongly Agree					Agree		
21			Disagree				Disagree				Disagree				Disagree				Disagree	
22	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
23	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
24		Agree				Agree				Agree				Agree				Agree		
25			Disagree				Disagree				Disagree				Disagree				Disagree	
27	trongly Agree				Strongly Agree					Agree				Agree				Agree		
29	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree			S
31		Agree				Agree				Agree				Agree				Agree		
37		Agree				Agree				Agree				Agree						Strongly Disagr
39		Agree				Agree				Agree				Agree				Agree		

Table 1 (columns GG–GY)

Row 1: disagree that the following strategies are effective at reducing Dental Fear and Anxiety (DFA) among adult patients in your office?

#	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GQ	GR	GS	GT	GU	GV	GW	GX	GY
2	le Relaxatio	Muscle Relaxa	uscle Relaxa	Relaxation	iting Times	Waiting Ti	Waiting Timing	Times	Listen to Musi	Listen to	Listen to	Men to Music	tic Technique	sthetic Tec	sthetic Techni	Technique	veral Short S	Several S	Several Sho
3	trongly Agree				Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree		
4		Disagree					Disagree			Agree					Agree				Disagree
5		Agree			Strongly Agree					Agree					Agree			Agree	
6	trongly Agree				Strongly Agree					Agree					Agree		Strongly Agree		
7	trongly Agree				Strongly Agree					Agree					Agree		Strongly Agree		
8		Disagree		Agree						Agree					Agree			Agree	
9		Agree			Strongly Agree					Agree			Strongly Agree				Strongly Agree		
10																			
11		Agree			Strongly Agree					Agree			Strongly Agree				Strongly Agree		
12																			
13	ree		Strongly Disagree					Strongly Disagree			Disagree				Disagree		Strongly Agree		Disagree
14	trongly Agree				Strongly Agree					Agree			Strongly Agree				Strongly Agree		
15						Agree				Agree					Agree			Agree	
16		Agree				Agree				Agree			Strongly Agree					Agree	
17		Agree			Strongly Agree					Agree					Agree				Disagree
18					Strongly Agree					Agree					Agree		Strongly Agree		
19																			
20		Agree			Strongly Agree			Strongly Agree							Disagree		Strongly Agree		
21		Disagree				Agree				Agree					Agree				Disagree
22	trongly Agree				Strongly Agree			Strongly Agree					Strongly Agree				Strongly Agree		
23	trongly Agree				Strongly Agree			Strongly Agree					Strongly Agree				Strongly Agree		
24		Agree				Agree				Agree					Agree			Agree	
25		Disagree			Strongly Agree			Strongly Agree					Strongly Agree				Strongly Agree		
26																			
27		Agree			Strongly Agree			Strongly Agree							Disagree				Disagree
28																			
29	trongly Agree				Strongly Agree			Strongly Agree					Strongly Agree						Disagree
30																			
31		Agree			Strongly Agree			Strongly Agree							Disagree				Disagree
37	ree		Strongly Disagree			Agree					Disagree		Strongly Agree				Strongly Agree		
39		Agree				Agree		Strongly Agree					Strongly Agree					Agree	

Table 2 (columns GZ–HR)

Row 1: Please identify how frequently you use the follow

#	GZ	HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	HL	HM	HN	HO	HP	HQ	HR
2	eral Short S	Choices - S	tient Choice	nt Choices -	hoices - S	n techniques -	Sn Technique	Techniques	niques - S	Nanations - S	Explanation	Explanations	anations - St	During, ar	efore, Durin	fore, During	During, an	centify Patie	to Identify P
3	Strongly Agree					Strongly Agree				Strongly Agree					Agree				Agree
4		Agree					Agree				Agree				Agree				
5		Agree					Agree				Agree				Agree				
6		Agree					Agree			Strongly Agree				Strongly Agree					Agree
7	Strongly Agree					Strongly Agree					Agree				Agree				Agree
8		Agree					Agree				Agree				Agree				Agree
9	Strongly Agree					Strongly Agree				Strongly Agree					Agree				
11	Strongly Agree						Agree				Agree				Agree				Agree
13			Disagree				Disagree				Disagree				Disagree				
14	Strongly Agree					Strongly Agree				Strongly Agree				Strongly Agree					Agree
15		Agree					Agree				Agree				Agree				Agree
16	Strongly Agree						Agree			Strongly Agree				Strongly Agree					
17		Agree					Agree				Agree				Agree				
18			Disagree				Agree				Agree				Agree				Agree
20		Agree				Strongly Agree				Strongly Agree				Strongly Agree					Agree
21		Agree					Agree				Agree				Agree				Agree
22	Strongly Agree					Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree	
23	Strongly Agree						Agree			Strongly Agree				Strongly Agree					Agree
24		Agree						Disagree		Strongly Agree					Agree				Agree
25	Strongly Agree					Strongly Agree				Strongly Agree				Strongly Agree				Strongly Agree	
27	Strongly Agree						Agree			Strongly Agree				Strongly Agree					Agree
29			Disagree			Strongly Agree				Strongly Agree		Strongly Disagr	trongly Agree		Disagree		Strongly Agree		
31			Disagree			Strongly Agree				Strongly Agree					Disagree				
37	Strongly Agree						Agree			Strongly Agree					Agree				
39		Agree				Strongly Agree				Strongly Agree					Agree				Agree

Table 3 (columns HS–IL)

Row 1: ing behavior guidance strategies to reduce Dental Fear and Anxiety (DFA) among adult patients in your office?

#	HS	HT	HU	HV	HW	HX	HY	HZ	IA	IB	IC	ID	IE	IF	IG	IH	II	IJ	IK	IL
2	Identify P	antify	Patients	Waiting Tim	Waiting Ti	Waiting Tim	Waiting Ti	o Listen to M	to Listen to	Listen to M	to Listen to	sthetic Tec	sthetic Tec	sthetic Tec	sthetic Tec	Several Sho	Several S	Several Sho	Several Sh	ent Choice	sient Choices
3			Always					Seldom				Often				Often			Always	
4	Disagree			Often		Always					Always					Often	Seldom		Always	
5	Disagree		Always			Always						Often				Often				
6			Always	Often			Often					Often				Often				Often
7			Always			Always						Often				Often			Always	
8				Often			Often					Often				Often			Always	Often
9			Always			Always					Always				Always				Always	
11			Always			Often					Always				Always				Always	
13	Disagree			Often			Often					Often				Often				Often
14				Often				Seldom				Often				Often			Always	
15			Always			Always					Always				Always				Often	
16	Disagree		Always					Seldom			Always	Often				Often				Often
17	Disagree		Always			Always					Always						Seldom		Always	
18			Always				Often					Often			Always					Often
20			Always			Always								Never		Often			Always	
21				Often		Always					Always						Seldom		Always	
22			Always			Always						Often				Often	Seldom		Always	
23			Always				Often					Often					Seldom		Always	
24				Often			Often					Often				Often				Often
25				Often			Often					Often				Often				Often
27			Always				Often			Never			Seldom			Often			Always	
29			Always			Always					Always						Seldom			Often
31	Disagree		Always			Always							Seldom				Seldom			
37			Always					Seldom			Always				Always				Always	
39				Often		Often						Often				Often				Often

	IM	IN	IO	IP	IQ	IR
1						
2	ient Choices	ient Choices	n Technique	n Technique	n Technique	n Technique
3					Seldom	
4				Often		
5	Seldom				Seldom	
6					Seldom	
7				Often		
8				Often		
9			Always			
10						
11				Often		
12						
13				Often		
14				Often		
15			Always			
16				Often		
17					Seldom	
18				Often		
19						
20			Always			
21					Seldom	
22				Often		
23				Often		
24					Seldom	
25				Often		
26						
27					Seldom	
28						
29				Often		
30						
31	Seldom		Always			
32						
33						
34						
35						
36						
37					Seldom	
38						
39				Often		
40						

90

Appendix B: Dental Fear & Anxiety Survey Email Content and Cover Page:

<u>Subject Line for Email:</u>

Dental Survey on Fear & Anxiety Management in your Practice (Student Research)

<u>Email Content:</u>

Dr. (Insert Dentist's Last Name),

My name is Sarah Moriarty, DDS. I am a senior resident at Nova Southeastern University in Fort Lauderdale, FL conducting a brief survey with the intention of collecting data about how we currently manage apprehensive patients in the dental office and to explore if a need exists to teach dentists how to efficiently and effectively use behavior techniques.

Dental Fear & Anxiety (DFA) can negatively affect the flow of your office and make easy procedures exasperating on anxious patients. Behavioral sciences can be incorporated into your dental practice to increase patient compliance and satisfaction. Properly applied techniques enable you to proficiently recognize and address patient apprehension, allowing you to run a more efficient practice. Completion of this survey will contribute to an endeavor that may increase behavioral sciences in dental education.

<u>Please help us </u>to collect data in order to fulfill my master's degree and pursue advocating for dental education that will benefit both the provider and patient by clicking on the survey link below.

Fear & Anxiety Guidance in your Practice Survey

Genuinely,

Sarah C. Moriarty, DDS

2nd Year PG Resident

Nova Southeastern University

Email: moriartydds@gmail.com

Romer A Ocanto, DDS, MS, Med

Chairman of Pediatric Dentistry

Nova Southeastern University

3200 South University Drive

Davie, FL 33328

Opt out statement that appeared at the bottom of the page:

This email powered by Med E-Mail connects physicians with relevant commercial messages germane to the practice of medicine. If you wish to discontinue receiving messages from this sender please review your preference page here.

Dear Dental Colleague:

This survey is intended to investigate dentists' skills in treating dental fear and anxiety (DFA) in adult patients, current strategies used to treat these patients, and to explore the need for additional education.

Data collected from this questionnaire will be used to determine if there is a generalized lack of DFA training.

This questionnaire is voluntary and will take approximately 10-15 minutes to complete.

Appendix C: Dental Fear & Anxiety Survey:

Page 1:

Qualifying Questions:

1. What year did you graduate from a U.S. accredited dental school?

○ I did not graduate from a U.S. accredited dental school

○ Year (YYYY)

[   ]

2. Do you practice dentistry 2 or more days per week?

○ Yes

○ No

3. Do you treat Adult patients?

○ Yes

○ No

4. Do you ONLY treat adults with pharmacological management?

○ Yes

○ No

Page 2:

Definitions of Behavior Guidance Techniques

Behavior Shaping: A direct intentional response (by dentist) immediately following a behavior (by patient) to positively or negatively reinforce that behavior. (i.e verbal praise).

Communication/Education: Effective two-way interaction that acknowledges patient's hesitation/apprehension while demonstrating empathy. (i.ei providing information to correct misconceptions).

Distraction/Imagery: Directing attention or mental focus to a specific alternative stimuli or situation.

Successive Approximation: Slowly exposing a patient to a more invasive procedure while allowing them to maintain a sense of control. (i.e. running a handpiece with the bur next to a tooth, then slightly touching the tooth, and then finally on the tooth to acclimate the patient).

Signaling: A predetermined signal established between provider and patient that allows the patient to halt any procedure. (i.e. asking patient to raise their hand if they need a break).

Diaphragmatic/Relaxation Breathing: A taught form of slowly paced abdominal breathing to induce a physiological relaxation response.

Progressive Muscle Relaxation: A systematically guided tensing and relaxation of muscles taught to induce a physiological relaxation response.

5. Prior to reading the definitions above, were you familiar with each of the following behavior guidance techniques?

	Yes	No
Behavior Shaping	☐	☐
Communication/Education	☐	☐
Distraction/Imagery	☐	☐
Successive Approximation	☐	☐
Signaling	☐	☐
Diaphragmatic/Relaxation Breathing	☐	☐
Progressive Muscle Relaxation	☐	☐

PLEASE INDICATE YOUR LEVEL OF AGREEMENT WITH THE FOLLOWING:

6. The following behavior guidance techniques <u>are appropriate to use</u> when treating adults with Dental Fear and Anxiety (DFA).

	Strongly Agree	Agree	Disagree	Strongly Disagree
Behavior Shaping	☐	☐	☐	☐
Communication/Education	☐	☐	☐	☐
Distraction/Imagery	☐	☐	☐	☐
Successive Approximation	☐	☐	☐	☐
Signaling	☐	☐	☐	☐
Diaphragmatic / Relaxation Breathing	☐	☐	☐	☐
Progressive Muscle Relaxation	☐	☐	☐	☐

7. If properly trained, the following behavior guidance techniques <u>are effective when treating</u> adults with Dental Fear and Anxiety (DFA).

	Strongly Agree	Agree	Disagree	Strongly Disagree
Behavior Shaping	☐	☐	☐	☐
Communication/Education	☐	☐	☐	☐
Distraction/Imagery	☐	☐	☐	☐
Successive Approximation	☐	☐	☐	☐
Signaling	☐	☐	☐	☐
Diaphragmatic / Relaxation Breathing	☐	☐	☐	☐
Progressive Muscle Relaxation	☐	☐	☐	☐

8. You <u>can effectively apply</u> each of the following behavior guidance techniques when you treat adults with Dental Fear and Anxiety (DFA).

	Strongly Agree	Agree	Disagree	Strongly Disagree
Behavior Shaping	☐	☐	☐	☐
Communication/Education	☐	☐	☐	☐
Distraction/Imagery	☐	☐	☐	☐
Successive Approximation	☐	☐	☐	☐
Signaling	☐	☐	☐	☐
Diaphragmatic/Relaxation Breathing	☐	☐	☐	☐
Progressive Muscle Relaxation	☐	☐	☐	☐

Page 3:

Definitions of Behavior Guidance Techniques

Behavior Shaping: A direct intentional response (by dentist) immediately following a behavior (by patient) to positively or negatively reinforce that behavior. (i.e verbal praise).

Communication/Education: Effective two-way interaction that acknowledges patient's hesitation/apprehension while demonstrating empathy. (i.ei providing information to correct misconceptions).

Distraction/Imagery: Directing attention or mental focus to a specific alternative stimuli or situation.

Successive Approximation: Slowly exposing a patient to a more invasive procedure while allowing them to maintain a sense of control. (i.e. running a handpiece with the bur next to a tooth, then slightly touching the tooth, and then finally on the tooth to acclimate the patient).

Signaling: A predetermined signal established between provider and patient that allows the patient to halt any procedure. (i.e. asking patient to raise their hand if they need a break).

Diaphragmatic/Relaxation Breathing: A taught form of slowly paced abdominal breathing to induce a physiological relaxation response.

Progressive Muscle Relaxation: A systematically guided tensing and relaxation of muscles taught to induce a physiological relaxation response.

PLEASE INDICATE YOUR LEVEL OF AGREEMENT WITH THE FOLLOWING:

9. You understand the conceptual framework underlying each of the following behavior guidance techniques.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Behavior Shaping	☐	☐	☐	☐
Communication/Education	☐	☐	☐	☐
Distraction/Imagery	☐	☐	☐	☐
Successive Approximation	☐	☐	☐	☐
Signaling	☐	☐	☐	☐
Diaphragmatic/Relaxation Breathing	☐	☐	☐	☐
Progressive Muscle Relaxation	☐	☐	☐	☐

10. You are able to provide specific examples of how to use each of the following techniques in everyday practice.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Behavior Shaping	☐	☐	☐	☐
Communication/Education	☐	☐	☐	☐
Distraction/Imagery	☐	☐	☐	☐
Successive Approximation	☐	☐	☐	☐
Signaling	☐	☐	☐	☐
Diaphragmatic/Relaxation Breathing	☐	☐	☐	☐
Progressive Muscle Relaxation	☐	☐	☐	☐

11. You would like to learn how to effectively apply each of the following behavior guidance techniques in your dental practice.

	Strongly Agree	Agree	Disagree	Strongly Disagree
Behavior Shaping	☐	☐	☐	☐
Communication/Education	☐	☐	☐	☐
Distraction/Imagery	☐	☐	☐	☐
Successive Approximation	☐	☐	☐	☐
Signaling	☐	☐	☐	☐
Diaphragmatic/Relaxation Breathing	☐	☐	☐	☐
Progressive Muscle Relaxation	☐	☐	☐	☐

Page 4:

12. Do you agree or disagree that the following strategies are effective at reducing Dental Fear and Anxiety (DFA) among adult patients in your office?

	Strongly Agree	Agree	Disagree	Strongly Disagree
Reduction of Waiting Times	☐	☐	☐	☐
Allow Patient to Listen to Music	☐	☐	☐	☐
Alter Local Anesthetic Technique	☐	☐	☐	☐
Divide Treatment into Several Short Sessions	☐	☐	☐	☐
Give Patient Choices	☐	☐	☐	☐
Relaxation Techniques	☐	☐	☐	☐
Thorough Explanations	☐	☐	☐	☐
Question Patient on Feelings Before, During, and After Procedure	☐	☐	☐	☐
DFA Survey Instrument to Identify Patients with DFA	☐	☐	☐	☐

13. Please identify how frequently you use the following behavior guidance strategies to reduce Dental Fear and Anxiety (DFA) among adult patients in your office?

	Always	Often	Seldom	Never
Reduction of Waiting Times	☐	☐	☐	☐
Allow Patient to Listen to Music	☐	☐	☐	☐
Alter Local Anesthetic Technique	☐	☐	☐	☐
Divide Treatment into Several Short Sessions	☐	☐	☐	☐
Give Patient Choices	☐	☐	☐	☐
Relaxation Techniques	☐	☐	☐	☐
Thorough Explanations	☐	☐	☐	☐
Question Patient on Feelings Before, During, and After Procedure	☐	☐	☐	☐
DFA Survey Instrument to Identify Patients with DFA	☐	☐	☐	☐

Page 5:

14. How would you rate your clinical skills in management of adult patients with Dental Fear and Anxiety (DFA)?

Excellent	Good	Fair	Limited/None
○	○	○	○

15. Please rank the following healthcare professionals in order of preference for who you think would be the most suitable candidate to teach a course on integrating adult behavior guidance techniques into your office; with 1 = most suitable and 3 = least suitable.

[⇕] A Licensed Psychologist

[⇕] A Pediatric Dentist

[⇕] A General Dentist without Specialty Training

16. Approximately what percentage of your adult patients exhibit some degree of Dental Fear and Anxiety (DFA)?

○ <20%

○ 20-39%

○ 40-59%

○ 60-80%

○ >80%

17. On average, how many Continuing Education (CE) courses on the management of Dental Fear and Anxiety (DFA) have you attended in the last 10 years?

○ 0

○ 1

○ 2-4

○ 5-7

○ >7

18. Younger adults have less dental coping skills (decreased willingness to tolerate dental treatment) than older adults.

○ Strongly Agree

○ Agree

○ Disagree

○ Strongly Disagree

19. Compared to your first year in practice, in the past 12 months the number of patient who have interrupted a procedure due to Dental Fear and Anxiety (DFA) has _____ .

○ Decreased

○ Stayed the Same

○ Increased

20. How would you rate the quality of education you have received in dental school on the management of adults with Dental Fear and Anxiety (DFA)?

○ Excellent

○ Good

○ Fair

○ Poor

21. How would you rate the amount of time devoted in your dental school ciriculum towards education on managment of Adults with Dental Fear and Anxiety (DFA)?

○ Comprehensive

○ Sufficient

○ Limited

○ None

22. Patients with Dental Fear and Anxiety (DFA) improve with each subsequent visit under your care.

Strongly Agree	Agree	Disagree	Strongly Disagree
○	○	○	○

23. How would you rate the level of stress you experience when treating adult patients with Dental Fear and Anxiety (DFA)?

Very Stressful	Somewhat Stressful	Not at all Stressful
○	○	○

24. How would you rate the level of difficulty you experience when treating a patient with Dental Fear and Anxiety (DFA) compared to a patient who does not exhibit signs of Dental Fear and Anxiety (DFA)?

Very Difficult	Difficult	Easy	Very Easy
○	○	○	○

Page 6:

25. Are you willing to pay to participate in a Continuing Education (CE) course on non-pharmacological behavior guidance techniques for adults with Dental Fear and Anxiety (DFA)?

○ Yes

○ No

26. What is the extent of your dental education?

○ General Dentistry Degree

○ General Dentistry Degree with Advaced Education

○ General Dentistry Degree with ADA Recognized Dental Specialty Certification

○ Other (please specify)

_____

27. What is your gender?

○ Female

○ Male

28. How many years have you been in practice?

○ <1 Year

○ 2-5 Years

○ 6-15 Years

○ >15 Years

Appendix D: NSU IRB Approval

IRB Initial Approval

NOVA SOUTHEASTERN UNIVERSITY

MEMORANDUM

To: **Dr. Sarah Moriarty**
3200 South University Drive,
Fort Lauderdale, Florida 33328-2018

From: Cristina Garcia-Godoy, DDS, MPH, CCRP
College Of Dental Medicine

Signature

Date: January 7, 2015

Re: Dentists' Knowledge, Skills, and Application of Behavior Guidance Techniques on
Adults with Dental Fear & Anxiety. – ExemptCGG2015-29

I have reviewed the above-referenced research protocol at the center level. Based on the information provided, I have determined that this study is exempt from further IRB review. You may proceed with your study as described to the IRB. As principal investigator, you must adhere to the following requirements:

1) CONSENT: If recruitment procedures include consent forms these must be obtained in such a manner that they are clearly understood by the subjects and the process affords subjects the opportunity to ask questions, obtain detailed answers from those directly involved in the research, and have sufficient time to consider their participation after they have been provided this information. The subjects must be given a copy of the signed consent document, and a copy must be placed in a secure file separate from de-identified participant information. Record of informed consent must be retained for a minimum of three years from the conclusion of the study.

2) ADVERSE EVENTS/REACTIONS: The principal investigator is required to notify the IRB chair and me (954-262-5369) of any adverse reactions or unanticipated events that may develop as a result of this study. Reactions or events may include, but are not limited to, injury, depression as a result of participation in the study, life-threatening situation, death, or loss of confidentiality/anonymity of subject. Approval may be withdrawn if the problem is serious.

3) AMENDMENTS: Any changes in the study (e.g., procedures, number or types of subjects, consent forms, investigators, etc.) must be approved by the IRB prior to implementation. Please be advised that changes in a study may require further review depending on the nature of the change. Please contact me with any questions regarding amendments or changes to your study.

The NSU IRB is in compliance with the requirements for the protection of human subjects prescribed in Part 46 of Title 45 of the Code of Federal Regulations (45 CFR 46) revised June 18, 1991.

Cc: Protocol File

Health Professions Division
College of Dental Medicine
3200 South University Drive • Fort Lauderdale, Florida 33328-2018
(954) 262-7500 • Fax: (954) 262-1782
College of Osteopathic Medicine • College of Pharmacy • College of Optometry • College of Allied Health and Nursing • College of Medical Sciences

NOVA SOUTHEASTERN UNIVERSITY

MEMORANDUM

To: **Dr. Sarah Moriarty**
3200 South University Drive,
Fort Lauderdale, Florida 33328-2018

From: Cristina Garcia-Godoy, DDS, MPH, CCRP
College Of Dental Medicine

Signature

Date: January 21, 2015

Re: Dentists' Knowledge, Skills, and Application of Behavior Guidance Techniques on Adults with Dental Fear & Anxiety. – ExemptCGG2015-29

I have reviewed the amendment for the above-referenced research protocol at the center level. Based on the information provided, I have determined that this study is exempt from further IRB review. You may proceed with your study as described to the IRB. As principal investigator, you must adhere to the following requirements:

1) CONSENT: If recruitment procedures include consent forms these must be obtained in such a manner that they are clearly understood by the subjects and the process affords subjects the opportunity to ask questions, obtain detailed answers from those directly involved in the research, and have sufficient time to consider their participation after they have been provided this information. The subjects must be given a copy of the signed consent document, and a copy must be placed in a secure file separate from de-identified participant information. Record of informed consent must be retained for a minimum of three years from the conclusion of the study.

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Cc: Protocol File

REFERENCES

1. American Academy on Pediatric Dentistry Clinical Affairs Committee-Behavior Management S, American Academy on Pediatric Dentistry Council on Clinical A. Guideline on behavior guidance for the pediatric dental patient. *Pediatr. Dent.* 2013/2014;35(6):175-180.

2. Law CS, Blain S. Approaching the pediatric dental patient: a review of nonpharmacologic behavior management strategies. *J. Calif. Dent. Assoc.* Sep 2003;31(9):703-713.

3. Armfield JM, Heaton LJ. Management of fear and anxiety in the dental clinic: a review. *Aust. Dent. J.* Dec 2013;58(4):390-407.

4. Feigal RJ. Guiding and managing the child dental patient: a fresh look at old pedagogy. *J. Dent. Educ.* Dec 2001;65(12):1369-1377.

5. Elango I, Baweja DK, Shivaprakash PK. Parental acceptance of pediatric behavior management techniques: a comparative study. *J. Indian Soc. Pedod. Prev. Dent.* Jul-Sep 2012;30(3):195-200.

6. Bernson JM, Elfstrom ML, Hakeberg M. Dental coping strategies, general anxiety, and depression among adult patients with dental anxiety but with different dental-attendance patterns. *Eur. J. Oral Sci.* Jun 2013;121(3 Pt 2):270-276.

7. Lazarus RS. Coping theory and research: past, present, and future. *Psychosom. Med.* May-Jun 1993;55(3):234-247.

8. Klingberg G, Broberg AG. Dental fear/anxiety and dental behaviour management problems in children and adolescents: a review of prevalence and concomitant psychological factors. *Int. J. Paediatr. Dent.* Nov 2007;17(6):391-406.

9. Newton T, Asimakopoulou K, Daly B, Scambler S, Scott S. The management of dental anxiety: time for a sense of proportion? *Br. Dent. J.* Sep 2012;213(6):271-274.

10. Ahlin EM, Lobo Antunes MJ. Locus of Control Orientation: Parents, Peers, and Place. *Journal of youth and adolescence.* Jan 24 2015.

11. Roberts JF, Curzon ME, Koch G, Martens LC. Review: behaviour management techniques in paediatric dentistry. *Eur. Arch. Paediatr. Dent.* Aug 2010;11(4):166-174.

12. Farhat-McHayleh N, Harfouche A, Souaid P. Techniques for managing behaviour in pediatric dentistry: comparative study of live modelling and tell-show-do based on children's heart rates during treatment. *J. Can. Dent. Assoc.* May 2009;75(4):283.

13. Glasrud PH. Dentists' characteristics and child behavior management techniques. *ASDC J. Dent. Child.* Sep-Oct 1984;51(5):337-343.

14. Sharath A, Rekka P, Muthu MS, Rathna Prabhu V, Sivakumar N. Children's behavior pattern and behavior management techniques used in a structured postgraduate dental program. *J. Indian Soc. Pedod. Prev. Dent.* Jan-Mar 2009;27(1):22-26.

15. Strange DM. The evolution of behavior guidance: a history of professional, practice, corporate and societal influences. *Pediatr. Dent.* 2014;36(2):128-131.

16. Brahm CO, Lundgren J, Carlsson SG, Nilsson P, Hultqvist J, Hagglin C. Dentists' skills with fearful patients: education and treatment. *Eur. J. Oral Sci.* Jun 2013;121(3 Pt 2):283-291.

17. Newton JT, Buck DJ. Anxiety and pain measures in dentistry: a guide to their quality and application. *J. Am. Dent. Assoc.* Oct 2000;131(10):1449-1457.

18. Armfield J, Mohan H, Luzzi L, Chrisopoulos S. Dental anxiety screening practices and self-reported training needs among Australian dentists. *Aust. Dent. J.* Aug 5 2014.

19. Shaw DW, Thoresen CE. Effects of modeling and desensitization in reducing dentist phobia. *J. Couns. Psychol.* 2014-06-06 1974;21(5):415-420.

20. Hamzah HS, Gao X, Yung Yiu CK, McGrath C, King NM. Managing Dental Fear and Anxiety in Pediatric Patients: A Qualitative Study from the Public's Perspective. *Pediatr. Dent.* 2014;36(1):29-33.

21. Weiner AA, Weinstein P. Dentists' knowledge, attitudes, and assessment practices in relation to fearful dental patients: a pilot study. *Gen. Dent.* Mar-Apr 1995;43(2):164-168.

22. Corah NL, O'Shea RM, Ayer WA. Dentists' management of patients' fear and anxiety. *J. Am. Dent. Assoc.* May 1985;110(5):734-736.

23. Wide Boman U, Carlsson V, Westin M, Hakeberg M. Psychological treatment of dental anxiety among adults: a systematic review. *Eur. J. Oral Sci.* Jun 2013;121(3 Pt 2):225-234.

24.   Carlsson SG, Wide Boman U, Lundgren J, Hakeberg M. Dental anxiety - a joint interest for dentists and psychologists. *Eur. J. Oral Sci.* Jun 2013;121(3 Pt 2):221-224.

25.   Ogle OE, Hertz MB. Anxiety control in the dental patient. *Dent. Clin. North Am.* Jan 2012;56(1):1-16, vii.

26.   Kantaputra PN, Chiewcharnvalijkit K, Wairatpanich K, Malikaew P, Aramrattana A. Children's attitudes toward behavior management techniques used by dentists. *Journal of dentistry for children (Chicago, Ill.).* Jan-Apr 2007;74(1):4-9.

27.   Diercke K, Burger GD, Bermejo JL, Lux CJ, Brunner M. The management of dental anxiety and impact of psychosomatic factors on dentistry: is recent scientific research translated into German dental practices? *J. Health Psychol.* Dec 2013;18(12):1519-1528.

28.   Brahm CO, Lundgren J, Carlsson SG, Nilsson P, Corbeil J, Hagglin C. Dentists' views on fearful patients. Problems and promises. *Swed. Dent. J.* 2012;36(2):79-89.

29.   O'Shea RM, Corah NL, Ayer WA. Sources of dentists' stress. *J. Am. Dent. Assoc.* Jul 1984;109(1):48-51.

30.   Corah NL, O'Shea RM, Bissell GD. The dentist-patient relationship: perceptions by patients of dentist behavior in relation to satisfaction and anxiety. *J. Am. Dent. Assoc.* Sep 1985;111(3):443-446.

31.   Tay KM, Winn W, Milgrom P, Hann J, Smith T, Weinstein P. The effect of instruction on dentists' motivation to manage fearful patients. *J. Dent. Educ.* Jun 1993;57(6):444-448.

32.   Hill KB, Hainsworth JM, Burke FJ, Fairbrother KJ. Evaluation of dentists' perceived needs regarding treatment of the anxious patient. *Br. Dent. J.* Apr 26 2008;204(8):E13; discussion 442-443.

33.   Milgrom P, Fiset L, Melnick S, Weinstein P. The prevalence and practice management consequences of dental fear in a major US city. *J. Am. Dent. Assoc.* May 1988;116(6):641-647.

34.   Levy RL, Domoto PK. Current techniques for behavior management: a survey. *Pediatr. Dent.* Sep 1979;1(3):160-164.

35.   Weinstein P, Milgrom P, Hoskuldsson O, Golletz D, Jeffcott E, Koday M. Situation-specific child control: a visit to the dentist. *Behav. Res. Ther.* Jan 1996;34(1):11-21.

36.	Milgrom P, Vignehsa H, Weinstein P. Adolescent dental fear and control: prevalence and theoretical implications. *Behav. Res. Ther.* Jul 1992;30(4):367-373.

37.	Auerbach SM, Kendall PC, Cuttler HF, Levitt NR. Anxiety, locus of control, type of preparatory information, and adjustment to dental surgery. *J. Consult. Clin. Psychol.* Oct 1976;44(5):809-818.

38.	Kuhn BR, Allen KD. Expanding child behavior management technology in pediatric dentistry: a behavioral science perspective. *Pediatr. Dent.* Jan-Feb 1994;16(1):13-17.

39.	Richardson PH, Black NJ, Justins DM, Watson RJ. The use of stop signals to reduce the pain and distress of patients undergoing a stressful medical procedure: an exploratory clinical study. *Br. J. Med. Psychol.* Sep 1999;72 (Pt 3):397-405.

40.	Kritsidima M, Newton T, Asimakopoulou K. The effects of lavender scent on dental patient anxiety levels: a cluster randomised-controlled trial. *Community Dent. Oral Epidemiol.* Feb 2010;38(1):83-87.

41.	Forbes MD, Boyle CA, Newton T. Acceptability of behaviour therapy for dental phobia. *Community Dent. Oral Epidemiol.* Feb 2012;40(1):1-7.

42.	Response Rate Calculator. http://www.answersresearch.com.

43.	He Y. Circulation: Cardiovascular Quality and Outcomes. *Circoutcomes.* 2010(3):98-105.

44.	Ogletree BT, Oren T. Application of ABA principles to general communication instruction. *Focus on Autism and Other Developmental Disabilities.* 2001;16(2):102-109.