

EFFECTS OF VISUAL KINESTHETIC DISSOCIATION
ON DENTAL ANXIETY

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CHAPTER I

INTRODUCTION

Anxiety has emerged as a central theme of the twentieth century being recognized as such by Albert Camus, the French author, who referred to this era as "the century of fear" (Spielberger, 1972). The popularity of this theme is also witnessed in other artistic expressions including a sensitive poetic piece by W. H. Auden entitled Age of Anxiety, which is also the title of Leonard Bernstein's Second Symphony. Stress and the resulting anxiety from rapid changes in modern society is the subject of Toffler's best selling book Future Shock (Toffler, 1970). Freud (1969) claims this affective condition called anxiety truly restricts the lives of everyone at some time in their lives.

The presence of anxiety seems to encourage a person to avoid the threatening or anxiety-producing event, or if avoidance is not possible, to reduce that person's performance in that event (Rimm & Masters, 1974). One such event is proper dental treatment. Within the United States, it is estimated that between 7 and 21 percent of the total population experience anxiety that leads to the avoidance of dental care (Friedson & Feldman, 1958). When avoidance of dental treatment is impossible, these anxious patients demonstrate a lower threshold of pain (Lautch, 1971) in addition to decreased cooperation and receive a lower quality dental care (Gale & Ayer, 1969).

In a review of the literature, Eysenck (1952) states that many

researchers have sought to reduce anxiety and the effects it has by using a variety of approaches. In commenting on the review, Wolpe believes that "the reciprocal inhibition principle is indeed a master key to the cure of neurosis" (Wolpe, 1958, p. 220). He makes this claim not only based on the improvement of a greater percentage of subjects with the use of systematic desensitization, but also because of the shorter amount of time taken to inhibit the anxiety response, a mean of 31 sessions.

Recently, a new technique utilizing the reciprocal inhibition principle was developed by Bandler and Grinder (Cameron-Bandler, 1978). This technique is called Visual-Kinesthetic Dissociation (VK-D), (see Appendix A). Based on their clinical observation, they claim the VK-D relieves the anxiety of phobic patients within a one hour session (Bandler & Grinder, 1979; Harman & O'Neil, 1981; Goleman, 1979). This process relies on visual imagery and dissociation to achieve the reciprocal inhibition effect of decreasing the strength of one response by the elicitation of a simultaneous response.

Significance of the Study

As previously mentioned, anxiety in some way, shape, or form, effects the lives of everyone. Anxiety of dental treatment is certainly a valid example. Franco (1978) reports on Robbins' (1962) findings that 90 percent of his sample were fearful of dental treatment. Pinkham and Schroeder (1975) concluded that a majority of the population approach dental experiences with some degree of anxiety. Fear of dental treatment has become ". . . so common that it can almost be considered normal unless it is of some degree as to interfere with much needed dental

care" (Lautch, 1971, p. 151). Normal levels of fear may be considered as an optimal measure that enables a person to best approach and execute different life situations. An optimal amount of dental anxiety could be considered as that amount that increased the likelihood of an individual to engage in an effective dental hygiene program (Chambers, 1970).

Unfortunately, many people experience dental anxiety to the extent that it interferes with proper dental treatment. Lautch (1971) and Pinkham and Schroeder (1975) found that dental patients with dental anxiety have lower pain thresholds than other patients. Pinkham and Schroeder believe that this increased sensitivity to pain may be related to the uncooperative nature of the anxious patient. Gale and Ayer (1969) and Shoben and Borland (1954) also found that the anxious dental patients are prevented from cooperating with the dentist because of their fears. When there is additional pain and lack of cooperation on the part of the patient, more time is required from the dentist (Gale & Ayer, 1969) with the quality and the end results of the treatment being less than satisfactory (Gale & Ayer, 1969; Pinkham & Schroeder, 1975).

The most serious consequences of high dental anxiety is the avoidance of any dental treatment (Franco, 1978; Lautch, 1971; Friedson & Feldman, 1958; Gale & Ayer, 1969; Pinkham & Schroeder, 1975; Shoben & Borland, 1954; Crockett, 1963). Crockett (1963) found that extreme fear was the cause given by six percent of his sample who had not sought necessary dental care. In another sample, Friedson and Feldman (1958) report that 51 percent of their population failed to go for routine dental treatment and that nine percent of them gave fear as the reason for avoiding the treatment. In the same study, they report

21 percent of their population did not go for emergency dental care because of fear. Lauth (1971) found the percentage of those neglecting dental treatment due to anxiety to be nine percent. In a study on children, Sermit (1974) discovered 10 percent of his patients had avoided treatment because of dental anxiety.

Gale and Ayers (1969), using the figures of Crockett (1963) and Friedson and Feldman (1958) estimate that approximately 10 to 12 million Americans avoid dental care and countless others receive poor dental care because of fear. They continue by explaining that the poor oral health resulting from fear of the dental situation may influence the total physical and psychological health of the individual. This explanation is founded on the mouth being the source of food intake and the negative psychological effect of unsightly teeth as found to be the case by Hollinshead (1961).

The ways in which human beings are exposed to stress are many, and Lazarus (1966) points out that dental anxiety is an excellent area in which to study the physiological and psychological effects of stress. The anticipation of the aversive stimuli is a natural part of the dental situation, as it is with numerous other situations. Some areas, such as those who deal with school related fears, have followed the studies attempting to reduce dental anxiety and implemented programs similar to those which have proven successful (Johnson, 1979). Persons in psychology and counseling represent another discipline that are often faced with the objective of reducing the anxiety accompanying aversive stimuli. With the number of persons being influenced so significantly with feelings of being helpless in dealing with the stress (Corah, 1973a), it becomes apparent that methods that reduce this stress

would be worthwhile not only to the anxious patients but also to the professionals treating them (Gale & Ayers, 1969).

The purpose of the present study was to investigate the effectiveness of the use of the VK-D to reduce the anxiety of dental patients. As previously mentioned, Eysenck (1952) has reported that several techniques have already demonstrated their usefulness in reducing anxiety, yet there is a significant passage of time required in training to elicit the more desired response or a replication of the technique each time a desired response is needed. Should the VK-D, as proposed in this study, indicate that the training time and replication is not necessary, it could significantly effect the future treatment of anxiety by enabling individuals to overcome helplessness of dental stress in a quick and efficient manner.

Statement of the Problem

A review of the literature revealed that no empirical research has been reported testing the effectiveness of the VK-D in reducing anxiety (Harman & O'Neil, 1981). Additionally, the developers of the process spurn experimental test of the techniques on the grounds that it is founded on "a working model and not a formal theory with hypotheses that can be tested" (Goleman, 1979, p. 78). Nevertheless, this technique is being taught and practiced across the nation as a means of reducing anxiety and phobias. Therefore, this study was designed to examine the question: Can the use of the VK-D reduce the anxiety of dental patients?

Definition of Terms

Dental Patients: Subjects will be persons voluntarily seeking dental treatment at a state operated hospital, or at an Oral Surgeon's private practice both located in a large urban area in Oklahoma. Each subject will return a completed demographic questionnaire (see Appendix B).

Dental Treatment: Each subject was to receive a quadrant extraction, removal of all teeth in eight consecutive weeks by an Oral Surgery Resident in the hospital or by an Oral Surgeon in his private office.

Dental Anxiety: The measurement of dental anxiety was ascertained by the use of the Dental Anxiety Scale (DAS) (Corah, 1969) (see Appendix C) and by an averaging of four measurements (one every 30 seconds for two minutes) of the muscular tension in the frontalis muscle with an Autogen 1500 electromyograph (EMG) or a Cyborg BL533 EMG.

High Dental Anxiety: Subjects with scores of nine or more on the DAS will be designated as subjects with high dental anxiety.

Visual Kinesthetic Dissociation (VK-D): A six step method to reduce the phobic response as developed by John Grinder and Richard Bandler (see Appendix A).

Experimental Group: A group of 15 randomly selected subjects who will receive the VK-D prior to dental treatment.

Control Group: A group of 15 randomly selected subjects who will view a 15 minute informational slide show (ISS) presentation on oral surgery prior to dental treatment.

Limitation of this Study

Any attempts to generalize the results of this study should be limited to populations with sufficient similarity to the subjects in this study with similar anxieties. Before any definite conclusions may be made regarding the value to the VK-D techniques as a means to reduce anxiety, it should be tested with other populations who are affected by other anxieties.

Assumptions

The efficacy of the current study relies on the following assumptions:

1. The DAS has adequate reliability and validity to give an accurate measurement of dental anxiety present in the group of dental patients used in this study.
2. The EMG readings reflect an accurate picture of the intensity of anxiety present in the groups of dental patients used in this study.
3. Any extraneous variables will be adequately controlled by randomization.

Hypotheses

The .05 level of confidence is needed to reject the following null hypotheses:

1. There will be no significant difference in the reduction of dental anxiety between the experimental group and the control group after receiving an assigned treatment.

2. The reduction of dental anxiety of the experimental group will not remain significant two weeks after receiving their treatment.
3. The reduction of dental anxiety of the experimental group will not remain significantly greater than the control group two weeks after receiving their treatment.

Organization

Chapter I has presented an introduction to dental anxiety and the VK-D, the significance of the study, statement of the problem, and the hypotheses to be tested. Chapter II reviews the literature and reports on its significance to this study. The methodology and instrumentation used in this investigation are discussed in Chapter III, and the findings are presented in Chapter IV. The summary, conclusions, and recommendations are presented in Chapter V.

CHAPTER II

RELATED LITERATURE

The review of related literature includes three areas pertinent to this study. The chapter begins with an examination of the historical explanation of the concept of dental anxiety. The review continues with a discussion of the experimental research that has been conducted to reduce dental anxiety. The last section of the chapter provides the structural framework from which it can be assumed that the VK-D might reduce anxiety by comparing the processes involved in the VK-D with the processes of other research that have previously been shown to reduce anxiety.

Origin of Dental Anxiety

The importance of the concepts of fear and anxiety have long been recognized by humankind. Cohen (1969) traces the concept of fear back to ancient Egyptian hieroglyphics, yet it was not until Pavlov (1927) discovered experimental neurosis that investigations of fear were stimulated. Shortly after Pavlov's experiments, Freud (1936) postulated anxiety as being the fundamental problem in all neurotic symptom formation. May (1950) noted that fear was essentially a state of mind or attitude, a subjective condition of uncertainty in which there was the expectation that something painful or unpleasant might happen. Prior to 1950, Spielberger (1972) reported that there were relatively few

experimental investigations of anxiety in humans. This was quick to change when the Taylor Manifest Anxiety Scale (TMAS) (Taylor, 1953) was developed and stimulated anxiety research.

Much of the research since the development of TMAS and other anxiety measurement scales was intended to find the cause of anxiety. While there are several explanations of the origin of dental anxiety, they can be classified into two categories for comparison. Pusey (1973) used the concepts of a biogenetic school and an environmental school when referring to a discussion on the origin of hostility. The same division will be used to present the theories of dental anxiety. The biogenetic school represents those theorists believing that dental anxiety is an innate mechanism, automatically built into all individuals. The environmental school postulates that dental anxiety is the result of a series of events that occurs, or did occur, within close proximity of the individual. For the purpose of this research, the theorists of the environmental school best explains the origins of dental anxiety; however, summaries of the theories of both schools will be presented.

Todes (1972) and Salas, Forti, Saimovici, and Sirota (1969), discuss dental anxiety as being a result of confusion in the developmental stages through which each child must progress. Todes (1972) interpreted dental procedures, especially extractions, to be a personal violation of the primary level of developmental progress, the oral stage. This violation or intrusion therefore results in anxiety demonstrated within the dental situation.

Salas, et al. (1969) studied a group of eight children who refused to submit to dental treatment. They concluded, after presenting

transcripts of the first four group therapy sessions, that anxiety over dental treatment results from a confusion of the oral and genital areas. The confusion of these children was observed in both play and verbal behavior demonstrated in the group sessions.

In Freud's original explanation of anxiety (Bender, 1953), he wrote that all anxiety was a result from the trauma of birth. Even Freud combined some of the concepts from the environmental school when he later revised his theory to include the possibility of anxiety being a result of some combination of an innate trauma and a learned response (Hall, 1954). Darwin (1965) explained that the potential for experiencing fear was an inherent characteristic of humans and animals which had evolved as an adaptive mechanisms over countless generations.

Lautch (1971) concluded that there is no evidence that genetics play a significant part in the development of dental phobias. His study reflected the role of modeling and early traumatic experiences with dental situation. Johnson (1971) and Shoben and Borland (1954) also found explanations of dental anxiety that were of an environmental nature. In his study of young children, Johnson (1971) found that the anxiety of the child's mother to be the major factor influencing anxious behavior demonstrated by the child. In their study of four hypothetical factors that could be used to identify individuals likely to react with anxiety, Shoben and Borland (1954) state only family attitudes and experiences as being significant. The other factors considered that did not prove significant were pain tolerance, traumatic experiences, and certain aspects of the personality.

In addition to family influences, Lautch (1971) studied the impact of early childhood trauma on the development of phobic responses to

dental situations. In a study of 34 dental phobics and 34 non-phobics, he found 100 percent of the phobics had experienced an early trauma related to dentists. This is compared to 29 percent (ten of thirty-four) non-phobics. Of the 34 phobics, four had never returned for dental treatment since the traumatic experience, while all of the remaining 30 had a second trauma associated with dental situations compared to only one non-phobic having a second trauma. These findings led him to reason that after one traumatic experience with dentists, phobics have a ten times greater chance of a second dental trauma within the next two or three visits. He concluded that early traumatic experiences must be considered as the most important etiological factor in phobias of dentistry.

Gale and Ayer (1969) and Corah (1973b) found effects of classical conditioning present in the acquisition of dental anxieties. The drilling, extraction, and probing were not frightening in and of themselves, but Gale and Ayer (1969) found they acted as anticipatory cues suggesting the possibility of pain. Patients then learned to associate these procedures with pain resulting in the conditioning process. Corah (1973b) used classical conditioning to create anxiety in situations related to dental treatment. He gave 20 psychology students of the State University of New York at Buffalo an electrical shock immediately following the viewing of dental segments of a film. The results of his procedure were the development of phobic responses among the individual's as measured by the galvanic skin response.

While both biogenetic and environmental explanations have been proposed, the majority of the theorists rely on environmental reasons for the development of dental anxiety. Most agree that the fears of

dentistry could be described best as being learned, either through modeling of family attitudes and behaviors or some conditioning process where pain or trauma have been associated with some dental care.

Treatment of Dental Anxiety

A review of the literature relative to various treatments used in reducing dental anxiety indicates a wide range of procedures have been attempted. The preponderance of the literature reflects methodologies that are more consistent with theorists from the environmental school and their explanations on the development of dental fears. The only authors found in this review that incorporate the philosophy of the biogenetic school in their treatment method were Salas, et al.(1969). They utilized separate psychoanalytic group treatment for anxious children avoiding dental treatment and for their mothers. Salas, et al. (1969) found that clarifications led to the acceptance of dental treatment by the children and relief of anxiety and guilt for the mothers.

The remaining literature utilizes a variety of environmental factors manipulated in different ways to produce the effect of reducing the anxiety of dental treatment. The treatment methods that previously have been used can be divided into three categories for this review. The categories include treatments incorporating the process of reciprocal inhibition where the anxiety is replaced with relaxation, treatments that used several different methods to provide temporary relief from anxiety, and treatments incorporating modeling of more desirable and productive behaviors than those associated with anxious behavior.

Reciprocal Inhibition

The principle of reciprocal inhibition was developed by Wolpe (1958) after he observed a process which successfully reduced anxiety responses of neurotic cats. The process, which was also used with neurotic dogs by Zbrozyna (1953), had the animals receiving food while in the presence of anxiety producing stimuli. This counter-conditioning process can have the effect of changing an undesirable response with a more desirable response. Wolpe (1958) describes this general principle.

If a response antagonistic to anxiety can be made to occur in the presence of anxiety evoking stimuli so that it is accompanied by a complete or partial suppression of the anxiety responses, the bond between these stimuli and the anxiety responses will be weakened (p. 71).

Relaxation is the response opposite to anxiety used most frequently by Wolpe, and is an integral element of his technique, systematic desensitization. Wolpe begins this procedure with training the anxious or phobic person in relaxation using progressive relaxation method as developed by Jacobson (1938). Meanwhile a list of events known as the anxiety hierarchy is developed. This is a list of the anxiety producing stimuli, ranked by the amount of anxiety they cause. The least anxious stimuli are at the bottom of the list while the most anxious are at the top. The individual is asked to relax as deeply as possible and to imagine the least anxious item on the list. Movement up the hierarchy occurs after the individual's relaxed state is unimpaired. If this relaxation is interrupted by the image of a stimulus, steps of the relaxation method are repeated. The list of events imagined is gradually progressed until at maximum intensity there is no disruption to the calm and relaxed person.

The success of systematic desensitization has been quite impressive. Paul (1969) reviewed all of Wolpe's published data on his subjects suffering from a variety of complaints and concludes that by using desensitization alone, Wolpe was successful with 92 percent. In one study (Wolpe, 1958), 210 subjects required a mean of 31 sessions while achieving a success rate of 90 percent. Lang and Lazovik (1963), in the first controlled experiment testing systematic desensitization Rimm and Masters (1974), found an appreciably greater reduction of snake avoidance than non treated control subjects. A six month follow-up indicated that the difference between the desensitization group and the control was greater than immediately following the treatment. These findings led Lang and Lazovik to conclude that the reduction in the phobic behavior must be assigned to the desensitization process itself.

Despite the success of systematic desensitization, its use in reducing dental anxiety has been limited. Gale and Ayer (1969) claimed to have treated "a number of dental phobics" with desensitization so they could seek necessary dental treatment without undue anxiety or fear. They presented a case history of a man who had avoided seeing a dentist for 13 years even though he had repeated toothaches. Before the ninth session, six of them involving the presentation of items from the hierarchy, the patient made and kept an appointment with a dentist. Gale, Hyman, and Ayer (1970) measured electrodermal responses, a physiological indicator of stress or anxiety reaction throughout the process of systematic desensitization. Two male dental phobics, one avoiding dental care for 12 years and the other for four years, received relaxation training and were presented with individually constructed hierarchies. Habituation of a relaxed response was achieved by both men

with repeated presentations of hierarchial items.

Variation of Wolpe's systematic desensitization have been attempted to produce similar results. Pinkham and Schroeder (1975) combined imagery with in vivo desensitization to succeed in getting a 14 year old female patient to present herself for dental treatment with no undue anxiety. Desensitization using visual imagery of what was to happen during dental treatment was accompanied with actual visits to the dentist's office assisted by her relaxation trainer in reestablishing a relaxed state if needed. By the fourth appointment the patient was able to tolerate a molar extraction. After the sixth treatment session, the patient was able to seek dental treatment without the trainer being present. Hoch (1972) also modified Wolpe's method and utilized hypnosis to obtain a state of relaxation in a study of 55 anxious dental patients. They were then presented with anxiety producing hierarchies. Success was obtained in 47 patients and 43 patients showed the results being maintained through a three month follow-up.

Jacobson (1938) used the principle of reciprocal inhibition in his technique of treating anxiety related disorders called progressive relaxation. Believing that relaxation and anxiety are antagonistic and therefore cannot exist in the same individual simultaneously, he teaches anxious patients deep muscle relaxation. Progressing through the body's muscle groups, the individual systematically tenses and relaxes the muscles. The value of the technique is that it trains individuals to detect small increases in muscular tension in addition to teaching the person the ability to relax.

Cooper (1975) describes a process of recording the relaxation procedure on a cassette tape that an anxious dental patient can play at

home or in the dental office. Used repeatedly, the relaxation response can be conditioned and be cued by the dentist to induce relaxation in the chair. Horan and Laying (1976) used such a tape, in addition to a neutral tape and a blank tape presented in counter balanced order to 27 female dental patients. While no significant difference was obtained on a measurement on their heart rate, self reported discomfort indicated a positive difference between the relaxation tape and the control tapes. Beck, Kaul, and Russell (1978) describe a method they call cue controlled relaxation, used in a treatment of ten subjects with dental anxiety. A progressive relaxation method was taught to be accomplished upon a verbal cue. Within six months of beginning treatment, eight subjects had successfully received dental treatment with reduced anxiety, one had not seen a dentist but did report having been helped in seeking a physician's appointment, and the tenth subject had left town without reporting.

Other researchers have compared the effects of progressive relaxation with other techniques designed to elicit a relaxed state. Miller, Murphy, and Miller (1978) found that there was no significant difference in the reduction of dental anxiety between ten sessions of progressive relaxation training and ten sessions of electromyograph (EMG) training. Both methods, however, were significant in comparison to the control group in three of the four measurements used; EMG levels, DAS, and the State-Trait Anxiety Inventory State (STAI-State). The STAI-State was not significantly different between the 21 subjects. Mcammond, Davidson, and Kovitz (1971) compared the effects of progressive relaxation and hypnosis with a group of 27 subjects. Using seven training sessions for each treatment, they found that relaxation and hypnosis,

while not different from each other, were more effective than the control group in reducing the anxiety of the frightened dental patients, according to a skin conductance measure. Self report anxiety scores and pain tolerance scores, however, showed no differences. A five month follow-up indicated that the hypnosis treatment group showed more approach behavior to the dental situation than the relaxation group.

Transcendental Meditation (TM) in addition to hypnosis and relaxation was studied by Morse, Martin, Furst, and Dubin (1977) as they monitored differences of five physiological measurements and a subjective verbal evaluation. The respiratory rate, pulse rate, blood pressure, skin resistance, electroencephalogram (EEG), and muscle activity of 48 patients were monitored during different states; alert, meditative, hypnotic, and relaxed. There were no significant differences between the relaxation states of meditation, hypnosis, and relaxation, except for the measure of muscular activity in which meditation was significantly better than the other states. In the subjective measure, both hypnosis and meditation were significantly better than relaxation, but no differences were found between hypnosis and meditation.

Morse (1977) in an exploratory study, taught dental patients a technique similar to Transcendental Meditation and found it less time-consuming for the dentist than traditional hypnosis. Other advantages of using meditation were greater patient acceptance, reduced anxiety, analgesia, saliva control, bleeding control, inhibition of gagging, euphoria, association of pleasure with dental treatment, and a reduction of pain.

Two studies reflect the use of hypnosis alone being successful in reducing fear and anxiety concerning dentists. Scardino (1974),

describes hypnotic procedures that suggest that these methods are beneficial for both the dentist, who can operate more easily, and for the patient, for whom the prognosis is more favorable. Svalland (1966) discusses hypnotic suggestions as being useful in eliminating fear and anxiety concerning dentists, dental equipment, injections, and pain. He points out one treatment difficulty. Individuals most needing it are those individuals whose fear prevent them from visiting a dentist making the treatment inaccessible. Pulver and Pulver (1975) present other problems associated with the use of hypnosis in medical and dental practices. In a study of 108 graduates of a medical and dental hypnotics course, it was found, 15 months after completing the course, that only 40 percent of the students without previous hypnotic training reported that they used hypnosis to some extent in their practice. The reasons those not using hypnosis gave more often for not practicing it were: (1) hypnosis takes too much time, (2) the doctor felt discomfort or lack of skill in its use, (3) the doctor was skeptical about the efficiency of hypnosis, and (4) both patients and colleagues had unreasonable expectations of hypnosis which created difficulties.

While the use of reciprocal inhibition has been shown to be effective in the treatment of dental anxiety, it does seem to have some limitations. Wolpe, the originator of systematic desensitization, required an average of 31 sessions to be successful. Relaxation training, meditation, and hypnosis also required multiple sessions to produce an effect capable of significantly reducing dental anxiety. Additionally, health professionals trained in hypnosis have some reservations about its use.

Relief Techniques

Reciprocal inhibition techniques are designed so a conditioning process can replace an undesirable response with a response more appropriate in the given situation. Other methods also have been used to accomplish this purpose for short intervals of time. They can be repeated each time the appropriate response is desired. These methods rely on the anxiety experienced by a dental patient to be a result of pain or the anticipation of pain.

Chaves and Barber (1976) compared acupuncture with hypnosis in reducing anxiety of surgery and eliminating pain. While both methods were able to help patients tolerate surgery, neither consistently eliminated pain. A total of six factors were cited that account for the apparent success of these methods. These factors pertain to patient selection, the patient-physician relationship, the preoperative "education" of the patient, the adjunctive use of drugs, and the use of suggestion of analgesia, and distraction.

The anxiety response resulting from watching a film depicting dental procedures was measured by Pillard, McNair, and Fisher (1974). They used the Profile of Moods State, a self-administered scale, to compare the responses of 33 males who were marijuana intoxicated and 15 controls. They found a significant reduction in the anxiety response for the marijuana group when compared to the control group.

Pillard and Fisher (1975) evaluated the effects of a benzodiazepine tranquilizer on outpatient dental patients. In each of six dental treatment sequences, 12 patients were given 10 mg. of chlordiazepoxide, 30 mg. of phenobarbital, and a placebo. Seven measures of anxiety were

used: a Situational Anxiety Scale, Taylor Manifest Anxiety Scale, Profile of Mood States, a Finger Sweat Print Scale, a side effects checklist, a Dentist's Anxiety Rating Scale, and post treatment questionnaire. The results of the measurements indicate that the medication produced a reduction in anxiety; however, high dental phobics did not appear especially responsive to the medication. Other limitations to the use of medication were noted by Pinkham and Schroeder (1975) even though its use has been effective in controlling dental anxiety. They cite drug therapy as having the potential of producing side effects, of being medically contraindicated, or of preventing the development of effective coping strategies.

Modeling

The use of films and video tapes has recently been added as treatment methods for a variety of clinical problems. Thelen, Fry, and Fehrenbach (1979) found in reviewing the literature relating to symbolic modeling (SM) that visual media is a convenient and efficient addition to the methods already available. The principle explaining the positive effects of SM has not been satisfactorily explained. Bandura (1977) wrote that it has not yet been determined if SM operates by extinguishing an old response or by leading to the acquisition of a new response, or some combination of both. He identified four principles that must be present for SM to achieve a productive effect. First, the observer must attend to the critical behavior being modeled in order to imitate it. Rehearsing the cognitive processes of imagery labeling and verbal labeling facilitate later imitation of a model when external

modeling cues are not present. Third, in order to imitate a behavior, an individual must have the motor ability to reproduce it. Last, even though the behavior can be acquired by observation alone, reinforcement is critical if the performance is to be continued over time.

Malamed (1978) evaluated the influence of different films presented to 80 children, ages 4-11. The films, one was a demonstration of dental procedures with a peer model and one without a peer model, were shown immediately preceding restorative treatment. The children watching the peer film exhibited fewer disruptive behaviors and reported less apprehension than those watching the film demonstration without a peer.

Melamed, Weinstein, Hawes, and Katin-Borland (1975) found that SM reduced anxious behaviors and anxiety, as reported by dental professionals, more than having the patient engaging in an irrelevant task prior to dental procedures. The patients' self report, however, indicated no difference in the two treatments. Subjects studied by Melamed, Hawes, Heiby, and Glick (1975) reflect SM as being more successful than the viewing of an irrelevant film in reduction of disruptive behavior. Again, patients' self reports, in addition to physiological measures did not support either method as reducing anxiety more than the other. SM was compared with desensitization and a control group in reducing dental fears of preschool children by Machen and Johnson (1974). While there was no difference between SM and a method of systematic desensitization similar to that as developed by Wolpe, both treatment groups were significantly more successful in reducing anxiety than the other.

Studies comparing the effects of SM and a combination treatment of relaxation and SM have been conducted by Shaw and Thoreson (1974) and

Wroblewski, Jacob, and Rehm (1977). Both involved monitoring the post treatment behavior and a self report measurement of anxious adults during dental situations. Shaw and Thoreson (1974) used the following methods: SM, deep muscle relaxation plus SM, an informational audio tape discussing dental procedures, and desensitization. The audio tape was least effective on both the behavioral and the self-report measures. Relaxation plus SM was the most successful on both measures. SM alone and desensitization were significantly better than the tape, but not significantly different from each other. Wroblewski, et al. (1977), found the SM group, the relaxation plus SM group, and the control group to have no significant differences in the self reports of the dental patients; however, the relaxation plus SM method was indicated to be significantly better at limiting disruptive behaviors.

Methods other than SM require the visual attention of anxious patients for reducing dental anxiety. In a comparison of imaginal flooding and rehearsal imagery, Mathews and Rezin (1977) checked all combinations for modifying the dental fear of 50 patients. Their findings suggest that high arousal flooding together with coping imaginal rehearsal were successful in reducing avoidance behaviors but not anxiety. Low level arousal with coping rehearsal reduced anxiety but not avoidance.

Dubin (1976) presented a case of a female dental patient who, while under hypnosis, was able to indicate her readiness for a dental procedure. Using two of the four principles involved in SM, careful observation and rehearsal, she incorporated the visual image of color into a subjective biofeedback instrument. This patient's readiness for surgery was correlated with the intensity, discreteness, and configuration of color that she imagined.

Daniels (1976) describes the case of a female in which covert modeling, covert reinforcement, and autohypnosis were used to reduce dental anxiety prior to surgery. Not only did he find the procedures helpful in reducing preoperative apprehension, but the hypnotic suggestions also reduced postoperative bleeding and pain.

While modeling and other techniques requiring concentrated visual imagery have indicated their usefulness in the treatment of dental anxiety, their use does appear to be limited. As the reciprocal inhibition techniques required multiple sessions to produce an effect, these visual techniques also require rehearsal and reinforcement to be successful.

Structural Framework of the VK-D

Bandler and Grinder (1979) have developed the VK-D with the assumption that phobic responses are developed by what they call a one-trial learning experience.

A person who has a phobia made a decision, unconsciously, under stress, sometime earlier in their life in the face of overwhelming stimuli. They succeeded in doing something that humans often have a hard time doing. They succeeded in one-trial learning. Everytime that set of stimuli comes up again later in their life, they make exactly the same response (p. 109).

This theory, consistent with other environmentalists, is then operated in reverse to relieve anxious responses. With the appropriate personal resources available, one-trial learning can be used to make the appropriate response available in certain situations. Other treatment methods mentioned previously, have not incorporated one-trial learning for repetition and rehearsal are essential elements in their success.

There are some indications that extensive practice sessions are not

necessary. Wolpin and Pearsall (1965) were reported by Rimm and Masters (1974) as successfully eliminating the phobic reactions to snakes in one individual in a single 90 minute desensitization session. It has also been noted by Thelen, Fry, and Fehrenbach (1979) that there is no research that documents that practice and rehearsal following the observation of SM influences the retention of the acquired behavior.

An important difference of VK-D and other methods is the choice of feelings that is associated to the phobic situation. While the techniques utilizing the reciprocal inhibition process in dental cases have relied on relaxation as the conditioned response, Bandler and Grinder use other resourceful feelings such as strength, confidence, maturity (Bandler & Grinder, 1979) and safety (Cameron-Bandler, 1978).

Claiming that genuine dangers may be present in the fear producing situations, the use of relaxation as the conditioned response may lead to one of two things to happen: either the symptom will come back later or the person will get hurt (Bandler & Grinder, 1979).

By finding out which desired response has been limited in certain situations and making that response available, appropriate responses can be generated by the individual. While Wolpe (1958) uses relaxation to provide relief of anxiety, he recognizes that there is "no a priori reason" to assume that only responses opposite of anxiety can inhibit it. The resource feeling used in the VK-D is a feeling identified by the individual as being the feeling needed by that person the first time they can remember being in the anxious situation.

The VK-D uses a process called anchoring "to locate the desired response and then associate it with the context in which [the person wishes] to experience it" (Cameron-Bandler, 1978, p. 109). This

emotional conditioning process frequently occurs in unsystematic ways. Natural examples of anchors, with memories and feelings associated with them, are common; special songs, certain fragrances, walking on sand, and Christmas can be experiences to stimulate otherwise forgotten memories (Gordon, 1978). It is claimed that when used systematically, anchors can allow counselors to make any feeling available and associate it in the desired context (Harman & O'Neil, 1981; Bandler & Grinder, 1979; Cameron-Bandler, 1978).

As previously mentioned, anxious and phobic responses are repeated as result of one-trial learning. Anchoring, and the construction of new possibilities using anchoring, can convert this previous set of limitations into a set of resources (Bandler & Grinder, 1979). The VK-D

. . . involves having a person watch himself from a third position; which allows him to watch himself watching himself going through the traumatic experience. In this way the person can remain comfortable while still remembering the experience because the kinesthetic (feeling) portion is disassociated from the visual memory (Cameron-Bandler, 1978, p. 119).

With the use of anchors at this moment of disassociation, new resources are incorporated into a person's behavior that will help them cope with the threatening situation without being overwhelmed (Harman & O'Neil, 1981).

A sorting process, similar to that used in a Gestalt double chair (Perls, 1973) and the Parent-Adult-Child paradigm of Transactional Analysis (TA) (Berne, 1964) is used to dissociate two parts of the individual; the younger part of the individual who previously encountered the threatening stimuli possessing limited helpful resources and a mature and confident part of the person possessing the needed resources to confront the stimuli. The act of utilizing the dissociated part of

the person at an earlier age is consistent with explanations of when people are first traumatized in a dental situation (Lautch, 1971; Johnson, 1971; Shoben & Borland, 1954). It is natural that a child's reaction to the dental experience is governed by the limitations of his own resources (Sermit, 1974). By integrating the two parts, the mature, resourceful feelings and the anxious reactions become available to be associated to the threatening situation. This product is described by other theorists as "integration" in Gestalt (Perls, 1973), a "redecision" in TA (Goulding & Goulding, 1976), and as "synthesis" in Psychosynthesis (Assagioli, 1965).

Visual imagery is used as a means of the sorting and integration process. Imagery, a process apparently available to all human beings except the congenitally blind (Masters, 1979), allows solutions and ideas to emerge which were impossible when the thinking is purely verbal (Houston, 1979). Houston also states that visual thinking is chiefly a right-hemispheric function and therefore is not time bound. This allows for more thoughts to be processed in a short amount of time and can be quite helpful in finding solutions to a variety of problems.

Summary

Most researchers have agreed from among the two schools of theory explaining dental anxiety, the environmental theories describe the origin more accurately than the biogenetic theories. Many techniques have attempted to reduce the anxiety which appears to be a result of family influences and early childhood traumas associated with dental situations. Of these techniques, reciprocal inhibition and visual techniques, such as modeling, have been successful, but require

repetition and rehearsal to produce their effects. Medication and other relief techniques require being repeated everytime that reduced anxiety is desired. Bandler and Grinder (1979) claim the VK-D is able to produce a reduction in anxious and phobic responses within a short period of time. Anchoring and dissociation are used to produce a one-trial learning experience that is claimed to be capable of integrating new resources for the individual facing the threatening dental situation.

CHAPTER III

INSTRUMENTATION AND METHODOLOGY

As previously mentioned, the purpose of this study is to investigate the efficacy of the Visual Kinesthetic Dissociation (VK-D) as a means of reducing dental anxiety. The chapter begins by discussing the instruments used to measure dental anxiety. The methodology used to conduct this study is also presented. Specifically, the selection of and demographic information on subjects, the treatment procedures, the training procedures, and the statistical analysis are examined.

Instrumentation

The Dental Anxiety Scale (DAS) was developed by Corah (1969) for researchers wishing to assess dental anxiety in their work. The measure, a simple, four-item multiple choice questionnaire, offers the subject a range of five answers, each indicative of an increasing amount of anxiety. An (a) choice, referring to the least amount of anxiety, is worth one point while an (e) choice, the maximum amount of anxiety, is worth five points. In one sample of 1,232 college student S's, a mean score of 8.89 was obtained with both the median and the mode being 8.0.

The reliability information on the DAS was calculated and reported for both internal consistency and stability over time (Corah, 1969). The Kuder-Richardson (K-R) Formula 20 was utilized to obtain a coefficient of .86, while the test-retest reliability was 0.82 when given to

171 S's twice, with a three-month interval between the two test administrations.

Two dentists assisted in gathering information used in determining the validity data on the DAS (Corah, 1969). Independent of the knowledge of how the patient answered the questionnaire, the dentists were asked to rate the patient's level of anxiety. With ratings of 104 patients between them, the correlations between the dentist rating and the patient's score were .41 and .42 ($p < .01$).

An Autogen 1500 or a Cyborg BL 533, utilizing the frontalis muscle placement as suggested by Venables and Martin (1967), was used to obtain a measurement of muscular tension, which Miller (1977) reports has been recognized by the majority of the studies as being higher in anxious subjects than in controls. The frontalis muscle placement was chosen for its proximity to the oral cavity and because of its easy accessibility. The microvolt meter was positioned to be visible to the researcher only, reducing any possible contamination effect resulting from the subject responding to the visual feedback. All meter readings were recorded in microvolts and then averaged to obtain a single microvolt reading (see Appendix E).

Methodology

Subjects

The sample of subjects for this study consisted of 30 volunteer oral surgery patients. Each subject was undergoing outpatient care at either a state operated hospital or an Oral Surgeon's private practice, both located in a large urban area in Oklahoma. The hospital is operated by the Department of Human Services and is one of three sites that

residents of Oral Surgery, in part, fulfill their residency requirements. The hospital chiefly serves socioeconomic classes best described as lower-middle and lower from within the state of Oklahoma. The private practice office is located in northwest Oklahoma City and serves a more varied socioeconomic population from the Oklahoma City area.

All of the subjects involved in this study underwent quadrant extractions. This oral surgery procedure involves the removal of all teeth within eight consecutive weeks. During the first, third, fifth, and seventh weeks, teeth in each of the four quadrant areas were removed. On the alternate weeks, weeks two, four, six, and eight, surgical stitches were removed.

Each patient undergoing this dental treatment between October, 1981, and March, 1982, received an explanation of the proposed research. Those patients volunteering to participate in this study were given the Dental Anxiety Scale (DAS) (Corah, 1969), and those volunteers who scored above the 50th percentile were selected as participants. A total of 36 patients volunteered to participate in this study; however, due to conflicts during the holiday season, six were lost due to scheduling difficulties, leaving 30 patients serving as participants. These 30 subjects completed a demographic questionnaire (Appendix B). Each subject was then randomly assigned to one of two groups, the VK-D experimental group and the ISS control group. The randomization procedure was accomplished by using the coin toss method.

In the six months that subjects were being studied, every dental patient volunteering to participate obtained a DAS score of nine or higher, qualifying each volunteer as a participant. The subjects' scores ranged from 9 to 17 with the mean score of 11.4 for the VK-D group and the mean score of 12.0 for the ISS group. The mean score for

TABLE I
DISTRIBUTION OF DAS SCORES FOR THE 30 SUBJECTS

Treatment Group	DAS Scores									Total
	9	10	11	12	13	14	15	16	17	
<u>VK-D</u>										
Frequency	3	3	3	2	0	3	1	0	0	15
Group Percentage	20	20	20	13	0	20	7	0	0	100%
<u>ISS</u>										
Frequency	2	2	3	3	2	0	1	1	1	15
Group Percentage	13	13	20	20	13	0	7	7	7	100%
<u>Total</u>										
Frequency	5	5	6	5	2	3	2	1	1	30
Total Percentage	17	17	20	17	7	10	7	3	3	100%

all subjects was 11.7. The distribution of the DAS scores can be seen in Table I (p. 32).

Males represented 60 percent of the total sample, with the VK-D group being 67 percent male and 33 percent female and the ISS group being 53 percent male and 47 percent female. Nearly two-thirds of the sample (63 percent) were Caucasians and one-third were Blacks. Only one Native American, three percent of the total sample, participated in the study.

The ages of the participants ranged from 36 to 64, the average age being 50. The distribution of ages for both groups is illustrated in Table II (p. 34).

The educational level of the VK-D group was slightly higher than that of the ISS group. A total of 47 percent of the VK-D group were educated past the high school level as compared to 40 percent of the ISS group (see Table III, p. 35). In both groups, 73 percent of the participants reported being employed, one-half of whom reported a monthly income in excess of \$1000 (see Table IV, p. 36)).

All subjects indicated an average of three years that had passed since they had sought dental treatment prior to the beginning of the present treatment. This average was slightly lower for the VK-D group, 2.8 years, than the ISS group, 3.2 years. The total distribution of time passed since the last dental care for all subjects can be found in Table V (p. 37).

Treatment Procedures

The screening and gathering of demographic information occurred immediately prior to the dental extraction in the third week of the surgical process. Upon patients' arrivals for dental treatment, the

TABLE II
 DISTRIBUTION OF SUBJECTS' AGES
 BY TREATMENT GROUPS

Treatment Group	Age						Total
	36-40	41-45	46-50	51-55	56-60	61-65	
<u>VK-D</u>							
Frequency	2	2	2	4	2	3	15
Group Percentage	13	13	13	27	13	20	99%
<u>ISS</u>							
Frequency	0	1	3	5	6	0	15
Group Percentage	0	7	20	33	40	0	100%
<u>Total</u>							
Frequency	2	3	5	9	8	3	30
Total Percentage	7	10	17	30	27	10	101%

TABLE III
DISTRIBUTION OF EDUCATIONAL LEVELS OF SUBJECTS
BY TREATMENT GROUPS

Treatment Group	Educational Level						Total
	Not Com- plete High School	High School Grad- uate	Voca- tional or Tech- nical School	1-2 Years Col- lege	3-4 Years Col- lege	Col- lege Grad- uate	
<u>VK-D</u>							
Frequency	6	2	1	3	0	3	15
Group Percentage	40	13	7	20	0	20	100%
<u>ISS</u>							
Frequency	4	5	3	1	0	2	15
Group Percentage	27	33	20	7	0	13	100%
<u>Total</u>							
Frequency	10	7	4	4	0	5	30
Total Percentage	33	23	13	13	0	17	99%

TABLE IV
DISTRIBUTION OF MONTHLY INCOME LEVELS OF SUBJECTS
BY TREATMENT GROUPS

Treatment Groups	Monthly Income Levels						Total
	0-199	\$200- \$399	\$400- \$599	\$600- \$799	\$800- \$999	\$1000 and More	
<u>VK-D</u>							
Frequency	0	0	2	1	3	9	15
Group Percentage	0	0	13	7	20	60	100%
<u>ISS</u>							
Frequency	0	1	2	4	2	6	15
Group Percentage	0	7	13	27	13	40	100%
<u>Total</u>							
Frequency	0	1	4	5	5	15	30
Total Percentage	0	3	13	17	17	50	100%

TABLE V
DISTRIBUTION OF YEARS PASSED SINCE
LAST DENTAL TREATMENT

Treatment Groups	Years								Total
	1	2	3	4	5	6	7	8	
<u>VK-D</u>									
Frequency	5	2	4	1	1	2	0	0	15
Group Percentage	33	13	27	7	7	13	0	0	100%
<u>ISS</u>									
Frequency	4	3	1	4	1	1	0	1	15
Group Percentage	27	20	7	27	7	7	0	7	102%
<u>Total</u>									
Frequency	9	5	5	5	2	3	0	1	30
Total Percentage	30	17	17	17	7	10	0	3	99%

receptionist handed them an information packet, including a sheet describing the study (see Appendix D). Also included in the packet was a consent form (Appendix F), the demographic questionnaire (Appendix B, and the DAS (Appendix C). The treatment procedure was randomly determined for each subject prior to their third week of oral surgery. The anxiety of the subjects was measured immediately before their extraction in the third and again in the fifth week. After the first week of extractions, all subjects had at least one experience facing the dental situation.

The treatment steps for the third week of the quadrant extraction surgery was as follows:

- Step 1: The EMG electrodes were attached to the frontalis muscle of each subject and allowed a two-minute adjustment period.
- Step 2: EMG microvolt readings were recorded every 30 seconds for two minutes and averaged to obtain a single microvolt measure (see Appendix E).
- Step 3: Depending on the treatment, the subject received either the VK-D from an advanced Ph.D. student of Counseling Psychology in the Department of Applied Behavioral Studies in Education at Oklahoma State University or viewed an informational slide show presently being used by an established group of oral surgeons in a large urban area in Oklahoma.
- Step 4: Immediately following the designated treatment, EMG microvolt readings were again recorded every 30 seconds for two minutes and averaged to obtain a single microvolt measure.

Step 5: The EMG electrodes were then removed and the surgical extraction was performed by the surgeon.

In two weeks, the subject returned for the third of the four quadrant extractions. The treatment steps for the fifth week were:

Step 1: The EMG electrodes were attached to the frontalis muscle of each subject and allowed a two-minute adaptation period.

Step 2: EMG microvolt readings were recorded every 30 seconds for two minutes and averaged to obtain a single microvolt measure (see Appendix E).

Step 3: Both treatment groups, the VK-D group and the slide show group, waited unattended for 15 minutes, the approximate length of time required for the VK-D and the slide show.

Step 4: EMG microvolt readings were recorded every 30 seconds for two minutes and averaged to obtain a single microvolt measure.

Step 5: The EMG electrodes were removed and the surgical extraction was then performed by the surgeon.

Training Procedures

Training was provided to an advanced Ph.D. student in the use of the electromyograph equipment and in the use of the VK-D. The EMG student received one hour of training in the use of the EMG, covering the attaching of the electrodes, reading the EMG levels from the microvolt meter, recording the EMG levels on the recording sheets (see Appendix E), and removing the electrodes. The standard frontalis

placement of two inches on either side of the center of the forehead and one inch above each eyebrow with the ground electrode midway between the other electrodes was used. The training methods utilized included didactic instruction as well as experiential supervision.

Training in the use of the VK-D was provided by a counselor working in the University Counseling Services, Oklahoma State University, who has received extensive training in Neuro-Linguistic Programming, the model of therapy as developed by Bandler and Grinder, and who is a member of the Society of Neuro-Linguistic Programming. The training program incorporates the suggestions by Harman and O'Neil (1981) and is divided into three sessions. The first session concentrated on the teaching of the Meta Model, ". . . a linguistic model [to allow a counselor to gain access to the] linguistic representation of [the client's] experience" (Harman & O'Neil, 1981, p. 450).

The second training session covered the use of anchors, ". . . the process of attaching a desired emotional state with a specific stimulus" (Harman & O'Neil, 1981, p. 451). This is accomplished by associating a stimulus with the emotional experience that is serving as the replacement. The intent of this training session was to teach the observational powers necessary to perform the anchoring process. This includes the ability to identify changes in posture, blushing, breathing, facial tension, or voice tone. Color video taping was used as an additional training method so the researcher performing the VK-D could become proficient at inserting the stimulus at the precise moment of the observed change, which is an indication of a change in an emotional state (Harman & O'Neil, 1981).

The third training session was to teach the steps involved in the

VK-D. The VK-D, explained in detail in Appendix A, can be summarized into six separate steps:

- Step 1: An anchor, eliciting the desired resource, is established. In this study, the researcher held a hand of the subject, and the resource anchor was elicited by gripping the clasped hand.
- Step 2: Visual imagery was used to accomplish a dissociation within the subject. The dissociation was accomplished by having the subject imagine a photograph of himself/herself, at a younger age, experiencing anxiety in a dental related situation.
- Step 3: Another dissociation was accomplished again with visual imagery. This time the subject was asked to imagine himself/herself having the feelings of strength and resourcefulness.
- Step 4: The subject was asked to look at the imaginary still photograph of himself/herself, from the perspective of himself/herself as being strong and resourceful, and turn the photograph into a moving picture. As the subject began viewing the "movie", the researcher gripped the hand of the subject, triggering the anchor of the resource feeling.
- Step 5: As the subject finished watching the movie, the conclusion of the previous threatening dental situation, the researcher then facilitated the integration of the dissociated parts of the subject.
- Step 6: The researcher tested to determine if the new

resource anchors had been integrated within the subject by having the subject imagine the upcoming dental extraction. If the reorganization had been accomplished, by the subject's report and by observing a different look, the posture, breathing, facial tension, or coloration than previously present when the subject was thinking of the anxious dental situation, the process was complete. If the reorganization was not accomplished, the researcher went back to Step 1 and elicited an additional resource anchor and proceeded through the other steps. Only one repetition of Step 1 through 6, if needed, was allowed and the entire procedure was restricted to 35 minutes or less. Five subjects had the VK-D procedure, or parts of the procedure, repeated.

In addition to teaching the VK-D in the final training session, the researcher was also taught how to operate the slide show. The slides, stored in a self-contained cartridge, were shown by inserting the cartridge into a tape player with a small video screen. The whole process is identical to inserting an eight-track cartridge into a tape player. The researcher remained in the room until the conclusion of the slide show.

Statistical Analysis

A three-way repeated measures analysis of variance was used to investigate the hypotheses. Anxiety reduction treatments were the between subjects effect, with weeks three and five and the pre- and

postmeasurement being the two within subjects effects in a Split Plot Factorial Design (SPF 2•22) (Kirk, 1968). This repeated measures design was chosen because it controls for subject heterogeneity which often obscures the treatment effect and because of the substantial increase in the degrees of freedom for the within subject error term.

A significance level of $p < .05$ was established in order to determine whether or not to reject the null hypotheses which are accompanied by their alternative hypotheses below.

HO₁: There will be no significant difference in the reduction of dental anxiety between the experimental (VK-D) group and the control (ISS) group after receiving an assigned treatment.

HA₁: There will be a significant difference in the reduction of dental anxiety between the experimental group and the control group after receiving an assigned treatment.

HO₂: The reduction of dental anxiety of the experimental group will not remain significant two weeks after receiving their treatment.

HA₂: The reduction of dental anxiety of the experimental group will remain significant two weeks after receiving their treatment.

HO₃: The reduction of dental anxiety of the experimental group will not remain significantly greater than the control group two weeks after receiving their treatment.

HA₃: The reduction of dental anxiety of the experimental group will remain significantly greater than the

control group two weeks after receiving their treatment.

These hypotheses require the examination of the three-way interaction between treatments, weeks, and pre/postmeasurements. More specifically, Hypothesis 1 is concerned with a two-way interaction (treatment by pre/postmeasurement) at the first level of the third variable (week three). Hypotheses 2 and 3 are examined by comparison tests of the two-way interaction of treatment by premeasurement for week three versus week five.

CHAPTER IV

RESULTS

This chapter presents the results as derived from the analysis of the data. The findings of the analysis of variance will be examined first, followed by offering the testing of the hypotheses. A brief summary of these findings will conclude the chapter.

Findings of the Study

In the three-way repeated measures analysis of variance design (Kirk, 1968), there were two levels of each variable. The two treatment groups (A) were the VK-D group (a_1) and the ISS group (a_2). Anxiety measures were recorded during two different weeks (B) of surgical treatment, week three (b_1) and five (b_2), and twice each week, a pre- (c_1) and a postmeasurement (c_2). The ANOVA Summary Table is presented in Table VI (p. 46). Significant differences exist, at a .05 level of confidence, in the main effects of treatment (A) and of pre/postmeasurements (C). A two-way interaction of treatment by pre/postmeasurement (AC) and a three-way interaction of treatment by week by pre/postmeasurement (ABC) were also found to be significant.

Tests of the Hypotheses

The purpose of this study has been to examine the data in order to determine whether to reject three null hypotheses. The first of these

TABLE VI
ANALYSIS OF VARIANCE SUMMARY
TABLE OF EMG LEVELS

Source	df	SS	MS	F
Between Subjects	28	1106.528		
A (Treatment)	1	175.899	175.899	5.10*
Subjects in A	27	930.629	34.468	
Within Subjects	87	50.938		
B (Week)	1	2.179	2.179	3.96
AB	1	0.103	0.103	0.19
B Subjects in A	27	14.870	0.551	
C (Pre/ Postmeasurement)	1	1.347	1.347	4.86*
AC	1	8.013	8.013	28.91**
C Subjects in A	27	7.483	0.275	
BC	1	0.073	0.073	0.19
ABC	1	6.575	6.575	17.24**
BC Subjects in A	27	10.295	0.381	
Total	115	1157.466		

* $p < .05$

** $p < .01$

hypotheses is concerned with the simple interaction effect of treatment by pre/postmeasurement at the first level of the third variable, week three. This null hypothesis states:

HO₁: There will be no significant difference in the reduction of dental anxiety between the experimental (VK-D) group and the control (ISS) group after receiving an assigned treatment.

A simple effects breakdown (Kirk, 1968) of the significant three-way interaction was used to examine the simple interaction effects at the first level of the third variable (AC at b₁). As can be seen from Table VII (p. 48), this simple interaction effect is significant at the .01 level of confidence. An advantage of using this simple effects breakdown is in its use of conservative degrees of freedom to reduce the possibility of obscuring any significant effects (Kirk, 1968). Therefore, it is with confidence that the first null hypothesis can be rejected. There was a significant difference in the reduction of dental anxiety between the VK-D group and the ISS group.

The significant simple interaction effect of AC at b₁ is somewhat misleading. This can be seen in Figure 1 (p. 49), where the direction of change, an increase or decrease in dental anxiety, is represented by graphing the means of each group in the four cells comprising b₁, week three of the surgical treatment. The means of the VK-D group shows a decrease of anxiety between the pre/postmeasurement while the ISS group means show an increase of anxiety.

An additional check can be accomplished by the use of the simple effects breakdown in Table VII (p. 48) to ensure that there was no significant difference between the anxiety of the VK-D group and the ISS group

TABLE VII
ANALYSIS OF VARIANCE SUMMARY TABLE FOR
SIMPLE EFFECTS BREAKDOWN

Source	df	SS	MS	F
A (Treatment)	1	175.899	175.899	5.10*
A at b ₁ c ₁	1	8.427	8.427	0.49
A at b ₁ c ₂	1	68.101	68.101	3.96
A at b ₂ c ₁	1	26.696	26.696	1.55
A at b ₂ c ₂	1	29.800	29.800	1.73
C (Pre/ Postmeasurement)	1	1.347	1.347	4.86*
C at a ₁ b ₁	1	11.408	11.408	29.94**
C at a ₁ b ₂	1	0.341	0.341	0.90
C at a ₂ b ₁	1	3.888	3.888	10.20**
C at a ₂ b ₂	1	0.085	0.085	0.22
AC	1	7.483	7.483	28.91**
AC at b ₁	1	14.309	14.309	25.97**
AC at b ₂	1	0.043	0.043	0.08

*p < .05

**p < .01

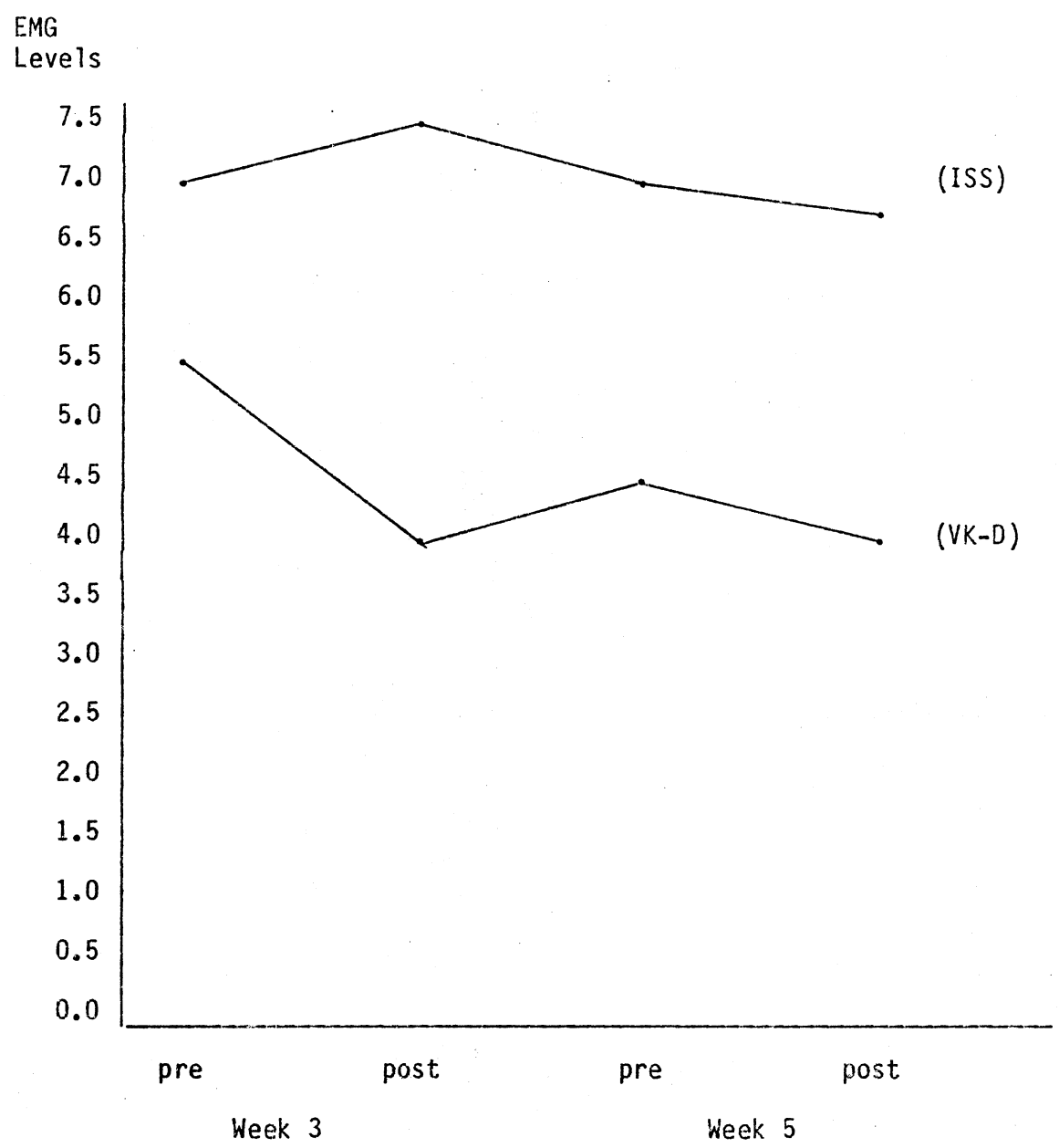


Figure 1. Group Means of Anxiety Measurements

before receiving their respective treatments. For there to be a difference between the two groups, the F value of A at b_1c_1 ($F = 0.49$) would have to be greater than 4.20 ($p < .05$). Therefore, there was no difference between the groups prior to receiving any treatment. From this same table, it can also be seen that there was no significant difference of anxiety after the treatment between the two groups ($F = 3.96$ at A at b_1c_2). Both of these F values were obtained by using conservative degrees of freedom as recommended by Kirk (1968).

The second of the null hypotheses tested in this study is concerned with the maintenance of any reduction of anxiety of the VK-D group from week three to week five. This null hypotheses states:

H0₂: The reduction of dental anxiety of the experimental group will not remain significant two weeks after receiving their treatment.

To test this hypothesis, Tukey's HSD post hoc comparison (Kirk, 1968) was used. The test for significance compares the VK-D group's premeasurement of anxiety at week three and week five ($A_1B_1C_1$ vs. $A_1B_2C_1$). By using this test, any reduction of anxiety as measured prior to receiving the VK-D can be detected. A critical value is computed by the following formula:

$$q = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{MS_B \text{ Subjects in A}}{n}}}$$

Using the means of $A_1B_1C_1$ and $A_1B_2C_1$ from Table VIII (p. 51), the q value of 3.842, significant at the .05 level, is obtained. Therefore, the second null hypothesis can be rejected.

TABLE VIII
GROUP MEANS OF ANXIETY MEASUREMENTS

Treatment Group	Week 3 Pre	Week 3 Post	Week 5 Pre	Week 5 Post
A ₁				
\bar{X}	5.40	4.17	4.67	4.46
s	2.08	1.76	2.27	2.33
Total	81	62.5	70.1	66.9
A ₂				
\bar{X}	6.92	7.69	7.03	6.91
s	3.63	3.63	3.67	3.86
Total	96.9	107.7	98.4	96.8

The last hypothesis of this study questions the maintenance of any reduction of dental anxiety for both the VK-D group and the ISS group two weeks after receiving their treatment. Tukey's post hoc comparison is used again to test the third hypothesis which states:

H₀₃: The reduction of dental anxiety of the experimental group will remain significantly greater than the control group two weeks after receiving their treatment.

Having already obtained a significant q value for the VK-D group ($A_1B_1C_1$ vs. $A_1B_2C_1$), the q value for the ISS group was computed using the same formula and the means from Table VIII (p. 51). The ISS group actually had a slight increase in anxiety (see Figure 1, p. 49) two weeks after the treatment ($A_2B_1C_1$ vs. $A_2B_2C_1$) and the q value for the ISS group equals -0.579. Statistically, this indicates that there was no significant difference for the ISS group, while there was a significant difference for the VK-D group. Therefore, the third null hypothesis can also be rejected.

Summary

A three-way repeated measures analysis of variance was used to test the possibility that significant differences would not exist between two treatments intended to reduce dental anxiety. With the confidence level set at $p < .05$, the main effects of both treatments as well as pre/postmeasurements were found to be significant. A two-way interaction, treatment by pre/postmeasurement, and the three-way interaction, treatment by week by pre/postmeasurement, were also significant.

In week three, the first week of the eight-week surgical treatment in which anxiety was measured, subjects receiving the VK-D treatment

showed a significant decrease in anxiety, while the subjects in the ISS group showed an increase in anxiety. Consequently, H_{01} was rejected.

In comparing anxiety measurements conducted in week three and week five, the subjects in the VK-D group showed a decrease in anxiety had maintained while the subjects in the ISS group showed an increase in anxiety had been maintained. Therefore, H_{02} and H_{03} were both rejected.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to examine the effects of the Visual Kinesthetic Dissociation (VK-D) as a means of reducing dental anxiety. A total of 30 subjects, undergoing outpatient oral surgery, volunteered to receive one of two treatments designed to reduce their anxiety. The subjects were randomly assigned to either the VK-D group or to a group watching an informational slide show (ISS). On the third and fifth weeks of the eight-week surgical process, the anxiety of the subjects was measured with the use of an electromyograph (EMG). Two measurements were taken each week, with the anxiety treatment being received between the two measurements during week three.

Three null hypotheses were tested and the .05 level of confidence was selected as necessary to reject the following hypotheses.

H0₁: There will be no significant difference in the reduction of dental anxiety between the experimental group and the control group after receiving an assigned treatment.

H0₂: The reduction of dental anxiety of the experimental group will not remain significant two weeks after receiving their treatment.

H0₃: The reduction of dental anxiety of the experimental

group will not remain significantly greater than the control group two weeks after receiving their treatment.

As a result of breaking down the significant three-way interaction (treatment by week by pre/postmeasurement), it was found that the two-way interaction of treatment by pre/postmeasurement in the third week (AC at b_1) was also significant. This resulted in rejecting the first null hypothesis. Post hoc comparison tests were calculated on the pretreatment measurements of both treatments, the VK-D and the ISS, between week three and week five. Both of these comparison tests were also found to be significant and the second and third null hypotheses were rejected.

Conclusions

The following conclusions are based upon the results of this study:

1. It does appear that awaiting oral surgery is indeed a time that is accompanied by increased dental anxiety. Every subject who volunteered and was administered the DAS scored in the upper 50th percentile of those who have taken the inventory. This indicates the usefulness of the dental situation as the context for studying stress as proposed by Lazarus (1966) and the potential value of a technique which demonstrates itself capable of reducing dental anxiety. While no attempt was made in this study to examine any generalization of anxiety being reduced outside of the dental setting, other authors suggests such generalizations may occur (Johnson, 1979; Gochman, 1977; Beck, Kaul & Russell, 1978). These generalized settings

include seeking other forms of health care and relieving school-related fears.

2. The experimental group showed a significant difference in the reduction of dental anxiety over the control group. This conclusion is strengthened by the results showing a decrease in anxiety for the experimental group while the control group showed an increase in anxiety. This finding suggests that cognitive information alone, as received by the control subjects who watched an informational slide show is not sufficient to reduce anxiety. This may validate an observation made by Wolpe (1958) when he found that 50 percent of his success could be attributed to being induced by a perceived reassurance associated with the interviewer. In the case of this study, perhaps the researcher's presence alone was more helpful to the VK-D group than was the recorded cognitive information given to the ISS group. This suggests that dentists may need to consider alternative methods to those of purely cognitive in the treatment of the highly anxious.

This conclusion also tends to support the philosophy as presented by Wolpin and Pearsall (1965), Thelen, Fry, and Fehrenbach (1979), Bandler and Grinder (1979), Cameron-Bandler (1978), and Harmon and O'Neil (1981) that extensive practice or rehearsal of a new behavior, relaxation in this case, is not necessary. The amount of time required to perform the VK-D in this study ranged from 20 minutes to a maximum of 35 minutes. Only five or

one-third of the experimental subjects required a repetition of the procedure or parts of the procedure. Overall, an average of 25 minutes was required for each subject.

While the data from this study suggests that the VK-D is capable of reducing anxiety, Wolpe (1958) warned against drawing conclusions about emotional responses based upon parasympathetic measurements, such as EMG levels. Wolpe noted that just because an emotional response is not accompanied by parasympathetic dominance, as in a reduction of EMG levels, that the response is not one of reduced anxiety. A reduction of anxiety is not necessarily reflected in objective measurements. It could also be concluded that an increase in EMG levels is not always a demonstration of increased anxiety. Therefore, the value of using measurements such as EMG levels is of limited use in drawing conclusions relative to an individual's experienced anxiety.

3. The reduction of dental anxiety by the use of the VK-D remained significant two weeks after receiving the treatment. Not only does it appear that the VK-D can provide immediate relief from dental anxiety, apparently it can provide longer relief as well. This suggests that the dental patients who received the VK-D had learned to generate a less anxious response well enough, that they were able to reproduce it two weeks later prior to receiving a similar dental treatment.

4. The reduction of dental anxiety of the experimental group remained significantly greater than the control groups two weeks after receiving their treatment. While the reduction of anxiety for the VK-D group was shown to be statistically significant, the mean decrease two weeks later amounted to 0.73 microvolts. This reduction is of questionable use in the practical application of the VK-D, considering the range of group mean EMG measurements were 7.69 to 4.17 microvolts. The reduction of muscular tension was accomplished in substantially less time than the methods discussed in the Reciprocal Inhibition and Modeling sections of Chapter II. Dental professionals may wish to evaluate whether the VK-D is worthy of the time required for the benefits they could receive in its practice use.

Recommendations

Based upon the findings of this study, the need for further research in the following areas is indicated.

1. A replication of this study should be undertaken to lend support to the findings of a significant reduction of anxiety as a result of using the VK-D.
2. Additional research should be conducted comparing the effect of the VK-D on anxiety with other anxiety reduction methods that involve personal interaction on the part of the researcher.

3. Additional studies are needed to determine any long term affects of the VK-D and its ability to reduce anxiety.
4. A variety of contextual situations that involve anxiety should be studied to determine the efficacy of the VK-D outside the area of dental anxiety.
5. While reducing the anxiety in given situations is often desired or even necessary, studies that measure the generalization of the effect would be valuable in determining the selection of the VK-D as the prescribed treatment method.

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APPENDICES

APPENDIX A

VISUAL KINESTHETIC DISSOCIATION

At some time or another in nearly everyone's life, we experience feelings of confidence and safety. Would you think of some situation, in any time or place, that you have had these feelings of confidence and safety. As you get those feelings, and any mental pictures or sounds that accompanied those feelings, reach out and hold my hand. At the moment that you can remember what those feelings were like, squeeze this hand, slowly. (After hand is squeezed, release the subject's hand.)

Very good. Now I understand that you have some scare about dental treatment, is that right? Can you remember the first time you ever felt afraid about a visit to the dentist? Would you look over there (pointing to an empty corner of the room) and picture yourself, as you looked then; just make a photograph in your mind's eye of that (pointing to the corner) younger you feeling the way you did then. Can you see yourself clearly over there (pointing to the corner)?

Fine, thank you. You know, each of us has some part of ourself that is quite helpful and creative. We know that is true because sometimes we find ourselves doing something new and different. What I would like is for that part of you, the helpful and creative part, to sort of float up above you (touching the subject lightly on the shoulder) so that you can see us sitting here together out of the corner of your eye.

Great. Now from this position (touching lightly on the shoulder) of being helpful, I want you to look over there (pointing to the corner of the room) at that younger you in that photograph you made earlier.

Here is my hand again and I want you to squeeze it as you watch that younger you over there (pointing to the corner) from this position (touching lightly on the shoulder) of the helpful and creative you. Turn that photograph of the younger you over there into a moving picture, and watch it, while squeezing my hand, from this other position (touching lightly on the shoulder). Slowly, watching you over there, from this position above you, until the movie is completed. (Hands are released when subject indicates they have completed the imagery task.)

After you have finished, let that part of you above you float back into your chair, and take a few moments to silently thank that younger you for its part in doing what it could do in its own way to protect you. You may also explain to it that you now realize that there are other ways to react to those kinds of situations, and that the resourceful part of you is now available to help you if you need it. When you have said those things, imagine that part of you also joining you again in this chair.

In a few moments, I will leave the room and the doctor will join you for your treatment. (If there is a change of coloration, breathing, tension, or posture that matches the physiological behavior previously observed while the subject was experiencing anxiety, the assistant will go back to step one and replace the words "confidence and safety" with words expressing an additional feeling as stated by the subject.)

APPENDIX B

DEMOGRAPHIC QUESTIONNAIRE

DEMOGRAPHIC QUESTIONNAIRE

 Respondent's Number

This information will be used only for the purposes of this study.
 Please use your respondent number. For the purpose of maintaining the
 confidentiality of this information, PLEASE DO NOT SIGN YOUR NAME.

 Sex: Male Female

 Race: Cauc. Black Native American
 Oriental Other

Age: _____

Number of dependents: _____

 Are you employed? Yes No

 Income (monthly): 0-\$199 \$600-\$799
 \$200-\$399 \$800-\$999
 \$400-\$599 Over \$1000

Highest level of education completed:

 did not complete high school 1-2 years college
 high school graduate 3-4 years college
 vocational school college graduate

 Approximate time passed since last dental treatment: _____

APPENDIX C

DENTAL ANXIETY SCALE

DENTAL ANXIETY SCALE

Respondent's Number

Please answer the following questions by circling the most accurate answer.

1. If you had to go to the dentist tomorrow, how would you feel about it?
 - a. I would look forward to it as a reasonably enjoyable experience.
 - b. I wouldn't care one way or the other.
 - c. I would be a little uneasy about it.
 - d. I would be afraid that it would be unpleasant and painful.
 - e. I would be very frightened of what the dentist might do?

2. When you are waiting in the dentist's office for your turn in the chair, how do you feel?
 - a. Relaxed.
 - b. A little uneasy.
 - c. Tense.
 - d. Anxious.
 - e. So anxious that I sometimes break out in a sweat or almost feel physically sick.

3. When you are in the dentist's chair waiting while he gets his drill ready to begin working on your teeth, how do you feel?
 - a. Relaxed.
 - b. A little uneasy.
 - c. Tense.
 - d. Anxious.

- e. So anxious that I sometimes break out in a sweat or almost feel physically sick.
4. You are in the dentist's chair to have your teeth cleaned. While you are waiting and the dentist is getting out the instruments which he will use to scrape your teeth around the gums, how do you feel?
- a. Relaxed.
 - b. A little uneasy.
 - c. Tense.
 - d. Anxious.
 - e. So anxious that I sometimes break out in a sweat or almost feel physically sick.

APPENDIX D

INFORMATION SHEET TO THE VOLUNTEER

This is to inform you of a study that is being conducted to measure the anxiety of dental patients. Because of the dental treatment you will be receiving, you are eligible to volunteer for this study. The purpose of this research is to investigate the effects of several techniques on the level of your dental anxiety prior to your dental treatment. If you choose to participate, please complete the questionnaires on the following two pages and return them to the receptionist. Next week, and the week following, a measurement of your muscle tension will be taken prior to your dental treatment. Participation in this study will not effect any charges you may incur as a result of your dental care. Thank you for your cooperation.

APPENDIX E

EMG RECORDING SHEET

EMG RECORDING SHEET

Respondent's Number

Week _____

EMG as measured in microvolts:

30 seconds _____

60 seconds _____

90 seconds _____

120 seconds _____

Average microvolts for pre-treatment measure: _____

EMG as measured in microvolts:

30 seconds _____

60 seconds _____

90 seconds _____

120 seconds _____

Average microvolts for post-treatment measure: _____

Time required _____

Subjects comments:

Researchers comments:

APPENDIX F

RESEARCH CONSENT FORM

UNIVERSITY OF OKLAHOMA HEALTH SCIENCES CENTER
INSTITUTIONAL REVIEW BOARD

CONSENT TO PARTICIPATE IN RESEARCH PROJECT

I, _____, voluntarily consent to participate in the
(patient or subject)
study entitled: EFFECTS OF VISUAL KINESTHETIC DISSOCIATION ON DENTAL ANXIETY.

I understand that the purpose of this research is to find out if fears of dentists and dental care can be reduced. If this study proves successful, relief from dental anxiety can be given more quickly than is presently possible.

I understand I will be assigned by chance to receive one of two anxiety reducing methods before receiving my second dental treatment. Either method will take about 30 minutes, and will also include the measuring of my muscle tension during that same time. Before my third dental treatment, my muscle tension will be measured for 30 minutes.

I understand that I will not be paid for participating in this study, but that I may benefit from it by having my dental anxieties reduced. I also understand that all information given about myself will be kept confidential.

I understand that there are no known risks involved in this study other than a possible skin reaction to the gel-like paste used in measuring muscle tension.

I understand that in the event of physical injury resulting from the research procedures employed in this study, no monetary compensation or free medical treatment will be provided by the institution.

I also understand that, if I have any questions or desire further information concerning the availability of compensation or medical treatment, I may contact the Director of Research Administration, University of Oklahoma Health Sciences Center, P. O. Box 26901, Oklahoma City, Oklahoma 73190; Telephone (405) 271-2090.

I understand if I choose not to participate or to withdraw from this study that my dental treatment will not be changed in any way.

Whereas no assurance can be made concerning results that may be obtained (since results from investigational studies cannot be predicted) my oral surgeon will take every precaution consistent with the best oral surgical practice. By signing this consent form I have not waived any of my legal rights or released this institution from liability for negligence. I may revoke my consent and withdraw from this study at any time. Should any problems arise during this study, I may take them to the Director of Research Administration, Room 115, O.U.H.S.C. Library Building, Telephone (405) 271-2090.

Date

Signature of Research Subject

Date

Signature of Principal or Collaborating Investigator

VITA²

William Dean Baker

Candidate for the Degree of
Doctor of Education

Thesis: EFFECTS OF VISUAL KINESTHETIC DISSOCIATION ON DENTAL ANXIETY

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