

# Treating the Apprehensive Dental Patient

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### Faculty Disclosure

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The director has disclosed no relevant financial relationship with any product manufacturer or service provider mentioned.

### Audience

This course is designed for all dental professions with patients who are apprehensive regarding dental treatments.

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### **Course Objective**

The purpose of this course is to provide insight about dental-based apprehension from the viewpoint of the patient and to suggest methods to increase patients' ability to obtain dental care.

### **Learning Objectives**

Upon completion of this course, you should be able to:

1. Differentiate between the terms used to describe levels of dental apprehension.
2. Discuss available tools to screen for dental fear and anxiety.
3. Describe common theories about the origin of dental apprehension.
4. List the most common situations or instruments that stimulate a stress response among dental patients.
5. Identify common verbal and nonverbal signs that indicate a patient is apprehensive about ongoing dental treatment.
6. Evaluate common behavior modification techniques used to treat apprehensive dental patients.
7. List common pharmacologic agents for the treatment of apprehensive dental patients.
8. Analyze the role of dental treatment modifications to assist in meeting the dental needs of apprehensive patients.
9. Discuss how dental staff is affected by providing dental treatment for apprehensive patients.

## INTRODUCTION

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Patients exhibit varying emotional and psychological responses as they prepare for an appointment for dental assessment and treatment. Some patients remain relaxed before and throughout dental treatment or may experience a minor degree of apprehension but can complete treatment with minimal emotional and psychological stress. However, for some patients, apprehension about dental treatment can progress to a degree that varying forms of sedation must be used to complete a dental procedure. Some people become so apprehensive about dental treatment that they cannot even make an appointment, forfeiting the benefits of preventive dental care and assuming an increased risk for dental caries, periodontal disease, acute pain, and infections of odontogenic origin [1]. Ironically, the pain and swelling that can accompany an emergency dental problem tend to make these patients even more apprehensive about seeking dental care. Needless suffering, cosmetic and functional problems that develop from the loss of teeth, absences from work, decreased self-esteem, and a diminished quality of life are among the problems attributable to the avoidance of dental care by apprehensive patients.

This course will provide information about the varying levels of dental apprehension and common sources of their origin. Procedures and situations considered to be sources of stress among dental patients and the common verbal and nonverbal signs that patients exhibit during these situations will be discussed, as will methods that the dental team can use to allay dental fear and phobia, including behavior modification, pharmacologic agents, and alterations in dental treatment. Finally, the emotional and psychological effects dental team members may experience as they provide treatment for apprehensive patients will be addressed.

## AN OVERVIEW OF DENTAL APPREHENSION

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Each person's unique physical, emotional, psychological, and spiritual history contributes to how he or she views life events and handles perceived stress. The same dental procedure performed by the same clinician may be considered uneventful by one patient but can cause enough apprehension in another patient that the procedure cannot be completed without the assistance of sedating agents. These responses represent opposite ends of the spectrum of dental apprehension, between which there are many increments of dental apprehension.

### DEFINITIONS

Many terms are used to describe dental apprehension, each with a different connotation and associated severity level. The most common terms used to describe dental apprehension are dental fear, dental anxiety, and dental phobia. These terms provide general guidelines for the degree of dental apprehension but should not be construed as absolute and rigid definitions.

#### Fear

Fear is an emotional reaction to real or imagined imminent danger or pain. A certain degree of fear provides a protective mechanism against environmental dangers, but some fears, such as those that pertain to dental care, are learned and exceed the level warranted by the actual threat [2]. The exact number of patients who are fearful of dental treatment is unknown, because research is complicated by the large and diverse patient population, lack of universal definitions, and reluctance of patients to admit to fears. Dental fear is generally considered to be a less severe reaction than clinical anxiety disorder and specific phobia, but it can vary from mild to severe.

### **Anxiety and Specific Phobia**

Anxiety is defined as a psychological distress reaction that develops in anticipation of a future threat. Severe, acute anxiety may manifest as a panic attack, a fear response experienced by many patients with anxiety disorders [49]. Patients with anxiety may also rely on avoidance of triggering situations. Anxiety is experienced as a prolonged sense of intense apprehension and uneasiness that can manifest as physical symptoms, including skeletal muscle tension, gastrointestinal disturbances, sleep disruption, hypertension, myalgia, neuralgia, and tension headaches [4]. Fear and anxiety can co-occur.

Anxiety disorders are the most commonly diagnosed psychiatric disorders in the general population, and specific phobia is the most commonly identified anxiety disorder [5]. Specific phobia is characterized by persistent (longer than six months), marked anxiety about a specific object or situation (e.g., flying, spiders, blood, dentistry) to the extent that the trigger is avoided or endured with severe fear or anxiety [49]. Patients with specific phobia will go to extremes to avoid the situation or the object that is the basis of their phobia. In dentistry, needle phobia can make the administration of a local anesthetic virtually impossible unless the patient has received some level of sedation. Claustrophobia, or the fear of being enclosed in and unable to escape from small spaces, may be triggered by coverings or masks (e.g., rubber dams) on the face, being surrounded by dental professionals during procedures, and/or small dental treatment rooms. Some objects or situations that are the basis for a person's phobias can be avoided. For example, a person can opt to drive or take a train rather than fly. However, there is no substitute for routine dental care, and avoiding it will increase the risk for the development of periodontal disease and carious lesions. These conditions will become more expensive to treat and more symptomatic with the passage of time, which can exacerbate the phobia.

As with any description of human behavior, the boundaries between fear, anxiety, and phobia are not absolute, and each patient's issues should be assessed on an individual basis. Co-existing psychiatric problems, such as depression, bipolar disorder, and schizophrenia, can further decrease a patient's ability to withstand dental treatment. It may be necessary for dental clinicians to consult with the patient's physician, psychiatrist, and/or psychologist before initiating dental treatment.

A person with mild dental fear can develop a phobia about dental treatment as time progresses, particularly if an adverse event occurs. A phobia is diagnosed when the fear or anxiety is out of proportion to the actual danger posed by the object or situation [49]. Most dental clinicians lack formal training in psychology and should refer patients to a psychologist or psychiatrist if their level of apprehension becomes an obstacle to obtaining dental treatment.

### **SCREENING**

The dental profession relies on precise measurements as an important parameter in assessing clinical situations (e.g., the depth of periodontal pockets) to determine the appropriate course of treatment. For example, a crown with an open margin of as little as 0.1 mm will allow bacterial ingress in between the crown margin and the prepared tooth, with the subsequent development of recurrent caries and a consequent clinical failure. Such precision requires patient cooperation in addition to clinician skill, and apprehensive patients may be unable to comply to the level necessary to ensure optimal dental care. Dental professionals should understand that patients' dental apprehensions are real and subjective; they cannot be measured objectively. However, there are questionnaires to help assess dental anxiety and fear. The Corah Dental Anxiety Scale uses a series of four questions with answers ranging from "A," for the lowest level or absent anxiety, through "E," for the most severe anxiety reactions. The lowest cumulative point total (4) corresponds to a relaxed patient, while the highest cumulative point total (20) identifies a patient with severe dental apprehension [52].

The Mount Sinai Dental Fear inventory consists of 14 situations common to the dental setting, with the option of listing one additional dental situation. Each item is assigned a value of 0 to 100, whereby 0 signifies complete relaxation and 100 indicates fear to the extent that the patient may faint, become ill, or be unable to continue with dental treatment [28]. The higher the cumulative point value, the higher the level of dental apprehension experienced by the patient. The answers patients provide to these questionnaires are subjective, but they provide the dental clinician with an initial baseline by which the level of apprehension can be assessed.

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## ORIGINS OF DENTAL APPREHENSION

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There are several theories about the underlying origins of dental fear, anxiety, and phobia. Given the variable level and extent of dental apprehension among patients, there is not one universal theory of etiology that can apply to all cases. This section will highlight the most commonly cited sources, but it is not an exhaustive list, and the apprehension may originate from multiple sources and be affected by the patient's unique emotional, psychological, physiologic, and spiritual history and makeup.

Studies indicate that the majority of patients with dental phobia have onset in childhood or adolescence, with an average age at onset of 12 years [40; 45]. Intense anxiety or unexpected panic responses in the presence of specific objects or situations can mark phobia onset but are not the sole causal route. Disgust, either alone or combined with fear, may trigger the onset and maintenance of blood-injection-injury phobias. Onset can even occur indirectly by observing others reacting fearfully. Some stimuli are more likely to induce phobias than others through evolutionary threat relevance.

Hyperactivity in certain parts of the brain (the amygdala, anterior cingulate cortex, and insula) is believed to be the underlying pathophysiology of specific phobia. In order for a true phobia to be diagnosed the fear or anxiety must be persistent (longer than six months) and markedly stronger than the actual threat of the object or situation [49]. However, even subclinical phobia can interfere with the delivery of dental care and the maintenance of optimal oral hygiene.

The origin of dental apprehension can be generally categorized into two distinct groups: exogenous and endogenous. Patients with exogenous dental fear and/or anxiety have experienced a traumatic dental event (either personally or vicariously). Examples of personally traumatizing dental events include difficult and lengthy surgical procedures, an inability to achieve an appropriate level of local anesthesia during a dental procedure, and severe pain following a dental procedure. However, not all patients who experience these or similar events during dental treatment will become fearful, anxious, or phobic toward future dental treatment. Endogenous dental fear or anxiety has no known triggering experience and instead develops as a result of an individual's unique predisposition or vulnerability to anxiety [6]. These categories are not mutually exclusive, and many patients display characteristics of each. It is important to remember that patients with a psychiatric or psychological disorder (other than specific dental phobia) may not have fear, anxiety, or phobia and may undergo dental treatment without incident.

The fear of pain is one of the most common sources of dental apprehension and is usually associated with previous experiences of dental treatment-related pain [7]. The avoidance of pain is a basic survival instinct and can trigger the "fight-or-flight" response that provides a protective mechanism for humans [8]. A traumatic dental experience can stimulate this basic, yet essential response and cause the patient to approach future dental appointments with fear, anxiety, or even phobia. Dental pain may also cause a loss of trust. If a dental clinician promises a procedure will be pain-free and this is untrue, the patient may believe any procedure can result in pain.

Beyond the fear of pain, there are many other situations that can cause varying levels of dental apprehension. The fear of a loss of control or helplessness is another potential source of dental apprehension [9]. Most dental procedures are performed with the patient in a supine position, with the dentist and assistant in a position above them. These positions can make some patients feel that they have relinquished control and that they are defenseless to communicate any degree of pain or discomfort to the dental staff. The introduction of unfamiliar dental procedures or instruments, unanticipated problems with the actual procedure, and prolonged treatment times may exacerbate these fears. An inability to see and understand the specifics of the dental procedure and the dental terminology being used between the attending staff members can create a feeling of isolation between the patient and staff, amplifying the patient's perception of loss of control.

The use of medications adjunctive to dental treatment can also contribute to patients' perception that they are not in control of their immediate situation. Sedation can depress neuromuscular reflex activity and make patients feel that they are in a vulnerable position. Most local anesthetics contain a vasoconstrictor (e.g., epinephrine) to prolong the effect of the anesthetic and facilitate the coagulation process after oral or periodontal surgery. Epinephrine is a catecholamine with a stimulant effect on the sympathetic nervous system. If a local anesthetic with epinephrine is inadvertently injected directly into an artery or a venous plexus, this can cause untoward effects. An intravascular bolus of epinephrine can increase heart rate, respiratory rate, and blood pressure, with patients experiencing heart palpitations and tightness in the chest that can mimic or precipitate a panic attack. An intravascular injection of the local anesthetic itself can have adverse effects on cardiac tissue and cerebral tissue, inducing syncope and seizures. Patients who have experienced these incidents can develop fear, anxiety, or phobia

of local anesthetic. It is important to note that the apprehension these patients develop is not generally related to a phobia of needles but is related to the potential adverse effects of the local anesthetic.

Another possible source of dental apprehension is excessive or aggressive criticism regarding patients' neglect of their oral health and presentation with advanced periodontal disease and widespread carious lesions. Fear of reprimand prevents some patients from seeking preventive dental care, creating a cycle of worsening oral health and increasing embarrassment and fear. Clinicians who strongly scold patients may increase patients' dental apprehension and construct another obstacle to needed dental treatment.

As a corollary, some patients who have not sought dental treatment for a long period of time and are aware of large carious lesions, fractured teeth, teeth with advanced mobility, gingival bleeding, and halitosis may believe that restoring their oral health is either hopeless or cost prohibitive. Similarly, some patients without symptoms of oral health problems may fear that a comprehensive dental examination will reveal problems they do not want to deal with, including caries, periodontal disease, impacted wisdom teeth, and benign or malignant oral lesions. The predominant concern for these patients is that the diagnosis of these conditions will require additional dental treatment and related costs and potential pain.

Distressing life experiences may also impact patients' approach and response to dental treatment. Studies indicate that victims of sexual assault are 2.5 times more likely to report high levels of dental anxiety than individuals who have not been sexually assaulted. Victims of sexual assault may feel particularly vulnerable when they are in a supine position in the dental chair. Patients who have been sexually abused are also more likely to have a heightened gag reflex and related fear and anxiety [10; 11].

In some patients, dental treatment fear may be related to a fear of contracting diseases such as hepatitis, herpes, or human immunodeficiency virus (HIV) directly from dental staff or indirectly from insufficiently disinfected or sterilized instruments or environmental surfaces. This fear is not necessarily unfounded, as there have been cases of disease transmission linked to dental care. The first widely publicized cases occurred in the late 1980s, when Dr. David Acer, an HIV-positive general dentist from Florida, allegedly infected six of his patients with the virus, although the mode of transmission is unknown [12]. More recently, in 2001, hepatitis B was transmitted from one patient to another in an oral surgery practice due to a breakdown in clean-up procedure. In 2009, five patients who attended a two-day portable dental clinic in West Virginia developed hepatitis B. A retrospective analysis revealed several breaches in the infection control regimen, any of which could have facilitated the outbreak [13]. In 2013, a documented case of the transmission of hepatitis C between two patients from an oral surgery practice in Oklahoma occurred, again due to a lapse in the infection control regimen [14]. Despite rare breaches, disease transmission in the dental setting is uncommon, particularly when infection control standards are followed. The best way to allay patient fear is to practice appropriate infection control procedures without fail after each patient encounter. Staff members should also be prepared to answer patients' questions about the facility's infection control standards.

It is clear that a variety of factors, exogenous and endogenous, contribute to the development and maintenance of dental fear and anxiety. It is good practice to include questions that focus on the patient's perceived level of dental apprehension, traumatic dental events of the past, and concerns about continued dental treatment in each medical history. A discussion between the dentist and the patient about these concerns before the initiation of dental treatment can assist in establishing an atmosphere of mutual trust and respect, which can provide the critical first step in addressing (and hopefully minimizing) fears and providing the necessary dental treatment.

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## THE MOST COMMON STRESSORS DURING DENTAL TREATMENT

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As noted, no single theory can explain the etiology of apprehension among dental patients. Likewise, there is not one dental instrument, situation, or procedure that is the source of fear, anxiety, or phobia among dental patients. In general, potentially stressful dental stimuli are characterized as one of the four S's: sights, sounds, smells, or sensations [3]. Any or all of the four S's can trigger a response of fear or anxiety in susceptible patients. Even the suspense of the initial waiting period in the dental reception area can be anxiety provoking [16]. An extended waiting time provides an opportunity for the patient to reflect on the nature of the treatment and any associated fears. Some patients may also become concerned that the extended wait time is a sign of clinician incompetence.

### NEEDLE AND INJECTION PHOBIA

In the dental setting, needles (mainly used for the injection of local anesthetics) and high- or low-speed hand pieces are the instruments most likely to induce fear or anxiety. Injection of a local anesthetic is indispensable when providing painless dental care. Most patients have a certain degree of fear of the injection process but can tolerate the procedure without event. However, approximately 10% of the population has *belonephobia*, a phobia of needles and injections [17]. Clinically, needle phobia is grouped with phobias of blood, injections, and/or trauma in the *blood-injection-injury phobia* category. There is some evidence that this type of phobia is or may be partially inherited, with higher concordance rates among first-degree relatives [17].

Fear of needles may be related to the pain during injection or the effects of the local anesthetic. Patients with needle phobia may describe the needle's length or diameter in exaggerated terms, in accordance with their experience of the object or another person's description of the needle. Patients with these fears may express concern about the possibility of tissue trauma, breakage of needles (perhaps requiring additional procedures to repair), or failure of the anesthetic.

Acute, exaggerated parasympathetic nervous system activity with exposure to needles, blood, and/or injections can cause fainting (vasovagal syncope), and this reaction is experienced by up to 80% of people with blood-injection-injury phobia [50].

### **HAND PIECES AND DRILLING**

Hand pieces are an essential tool in restorative dentistry. The high-speed hand piece may also be used during oral surgery for the removal of bone and for sectioning roots during surgical extractions. In recent years, lasers have replaced hand pieces for some restorative procedures, but while their use has decreased, high-speed and low-speed hand pieces are still commonly encountered. Both the sight and the sound of the high- and low-speed hand pieces can evoke fear and anxiety, possibly due to memories of previous dental appointments with inadequate anesthesia and/or pain. The vibrations of the hand pieces against the surface of the tooth can also be a source of anxiety, even if profound local anesthesia has been achieved. The combined aerosolized mixture of water, carious and non-carious tooth structure, and residual restorative materials can create an odor that may concern a patient and generate fear and anxiety during the procedure. Because a relatively large volume of water must be used with high-speed hand pieces to prevent the generation of potentially damaging heat, some water may accumulate in the patient's mouth, even with suction evacuation. For some patients, this will trigger a fear of choking or drowning or of an inability to communicate needs to the dental staff. This same concern may arise in response to the use of water in conjunction with ultrasonic scaling devices used during dental prophylaxis. Other patients may fear that the high- or low-speed hand piece will slip and cause an injury to the adjacent teeth and/or soft tissues, particularly for patients who have sustained this type of injury in the past. While nothing can completely eliminate iatrogenic injuries during dental procedures, fears can be allayed by a dentist-patient relationship based in mutual trust and respect and by meticulous attention to detail by the entire dental staff.

### **GAGGING**

Another common fear among dental patients is of uncontrollable gagging, which can lead to nausea, vomiting, choking, or swallowing dental materials or instruments. Gagging is a protective reflex that is meant to prevent the aspiration or ingestion of foreign bodies. The degree of stimulation required to initiate this response and the intensity of the response vary considerably among patients. In the oral cavity, the areas most likely to stimulate a gag response are the soft palate, the lateral surfaces of the posterior border of the tongue, and the dorsum of the tongue. However, even minimal stimulation of any intraoral surface can initiate a gag reflex in patients who are hypersensitive. Most commonly, a tactile sensation against susceptible intraoral tissues during dental treatment initiates the gag reflex, but visual, auditory, and/or olfactory stimuli can also induce this response [18]. For susceptible patients, obtaining impressions for fixed or removable prostheses may be difficult. Impression materials are viscous but can still flow toward the soft palate (in the case of maxillary impressions) or toward the posterior borders of the tongue (in the case of mandibular impressions). Patients may also fear that the flow of the impression material will extend into the pharynx and compromise their ability to breathe.

Patients who have experienced problems with the impression procedure in the past may begin to gag at the sight of the impression tray. Even the particular fragrance or taste of an impression material may trigger an excessive gag reflex. Numerous impression materials are available with varying complete polymerization times, and the option with the shortest set time should be selected for these patients. Vomiting or premature removal of the impression tray will ruin the impression and require that the process be repeated. Further, incompletely set impression materials can cling to teeth and soft tissues, and removing the residual materials can also stimulate a sensitive gag reflex.

While there are no universal solutions to eliminate the gag reflex and related problems, techniques have been developed to minimize a gagging response. Most dental procedures are accomplished with the patient in a supine position, but moving the patient to an upright position with his or her head tilted toward the floor will decrease the flow of impression material toward the posterior of the oral cavity. When possible, impressions may be taken with a quadrant tray rather than a full arch tray to minimize the amount of impression material introduced into the oral cavity.

Local anesthetic sprays may be applied to the mucosal tissues prior to taking an impression in an effort to decrease the gag reflex. However, these formulations should be used with caution, because if the spray is inadvertently directed into the pharynx, it can lead to laryngospasm.

Placement of salt on the tip of the tongue stimulates taste receptors whose ascending neural pathways lead to the hypothalamus, the part of the brain that also receives neural input for the gag reflex [19]. The presence of this competing stimulus can dampen the gag reflex. A similar diversion technique can be employed by having the patient lift his or her legs off the chair; the flexing of muscles can also provide enough of a distraction to reduce the intensity of the gag reflex. When these or similar techniques are not adequate, nitrous oxide sedation or anxiolytic medications may be required. When pharmacotherapy is used, a responsible adult driver should be present to transport the patient home.

These are among the most common situations that may cause a dental patient to develop apprehension about dental treatment, but it is not an all-inclusive list. Some patients will have very specific fears—of masks, being touched, or even certain lighting. When combined with the fear of pain and/or loss of control, these situations can become an obstacle in the ability to provide dental treatment. All dental clinicians should maintain an open dialogue with patients about situations that stimulate fear, anxiety, or phobias and pursue options to ameliorate them.

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## VERBAL AND NONVERBAL SIGNS OF FEAR AND ANXIETY

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The ability to detect varying degrees of patient apprehension can allow dental staff to address patients' concerns so treatment can be completed in a safe and comfortable atmosphere. Patients who are fearful or anxious about dental treatment may exhibit verbal and nonverbal signs of their discomfort. Some patients will not admit to feelings of fear and anxiety, but their behavior may indicate an underlying anxiety. While no single words, expressions, and/or body language characterize an apprehensive dental patient, there are cues that should trigger dental staff to inquire further about the patient's anxiety and ability to move forward with treatment.

Verbal signs of dental fear and anxiety include the actual words spoken, but also the manner and inflection of the speech. Speech cues that suggest underlying fear or anxiety include a trembling lip, variances in speech tone or inflection (e.g., vocal tremors), an atypically loud or silent demeanor, and a very rapid or very slow rate of speech [20]. Statements that reflect strong negative feelings about previous dental encounters may also be an indicator and include comments about hating dentists, hating to go to the dentist, fainting at the sight of a needle or after receiving an injection, having difficulty achieving local anesthesia, or being hurt during a previous dental encounter. Similarly, patients who speak with little or no eye contact may also have an undisclosed fear and/or anxiety of dental treatment.

Behavioral signs and body language may also be signals of a patient's dental apprehension. Being startled or jumping when a staff member enters the room, places an instrument or an x-ray film in the mouth, applies a topical anesthetic, or administers a local anesthetic are all potential signs of fear [21].

Strongly grasping the dental chair (e.g., “white knuckle”) is a classic presentation of an apprehensive dental patient. Patients who sit with their arms and/or legs crossed tightly, fidget or are generally uncooperative, shut their eyes tightly, hold their breath, have pronounced tension and flexion of the facial musculature, or require excessive breaks during a dental procedure are likely expressing stress and anxiety. Again, this is not an exhaustive list, but it reflects some of the more common physical manifestations of dental fear and anxiety. The greater the degree of underlying fear and anxiety, the greater the tendency to display these verbal and nonverbal signs.

Consideration should also be given to the verbal and nonverbal signs the dental staff provide as they interact with the apprehensive patient. Tension and animosity can manifest in hurried, abrupt, apathetic, or rude interactions with patients. Dental staff members who are immersed in their own concerns may ignore those of the patient and further perpetuate fear and anxiety. Dental professionals should not provide care to patients unless they have the patience and empathy to do so appropriately.

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## BEHAVIOR MODIFICATION TECHNIQUES

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Behavior modification techniques should be the first-line treatment for patients with dental fear or anxiety, before pharmacotherapy (e.g., oral, intravenous, or inhalation sedation) is employed. If behavior modification techniques are embraced by the patient, they have the potential to improve adherence to dental follow-up and prophylaxis appointments and reduce or even eliminate the need for sedation. However, it is important to remember that, despite best intentions, dental patients with extreme fear, anxiety, or phobia usually require some level of sedation in order to undergo dental treatment.

## CLINICIAN-PATIENT RAPPORT

Establishing rapport with patients during initial and subsequent encounters is a critical step in the provision of dental care. A relationship founded in trust and mutual respect will allow the dental professional to be cognizant of a dental patient’s fears and concerns and to respond to them appropriately. This simple practice can easily be overlooked in a busy clinical schedule that is production-oriented, but it is the basis for all other behavior modification techniques.

## DISTRACTION

Distraction can work for patients who display mild fear and anxiety about their dental treatment. Techniques for procedures of minimal duration, such as applying pressure or vigorously rubbing mucosal tissue that is about to be anesthetized, can be useful for patients with fear of injections. Distraction techniques for procedures of longer duration include the use of handheld electronic devices or intra-operative televisions to listen to music, watch movies, or participate in interactive games.

## GUIDED IMAGERY AND BREATHING EXERCISES

In guided imagery, the clinician walks the patient through visualization of him- or herself in a soothing place or having a pleasant experience. The purpose of guided imagery as a coping exercise is to provide the patient with a safe, healthy mental escape that he or she can access when needed. At first, the clinician’s voice is the guide to take the patient to this place. If a clinician feels uncomfortable developing guided imagery scenarios, there are many good free scripts available online, including hundreds of variations on the standard calm, happy, or safe place [15]. Patients who can develop and maintain a strong and detailed visualization will have a higher degree of distraction from their dental treatment.

Progressive relaxation can be particularly effective in patients who somatize stress into physical tension. This form of therapy involves tensing and relaxing individual muscle groups while breathing deeply, starting from the toes, working progressively through the calves, thighs, stomach, shoulders, hands, arms, and neck, and ending with the facial muscles [22].

Deep breathing exercises use slow, controlled breaths (while counting) to “quiet” racing thoughts. The influx of oxygen has a relaxing effect on the body [23]. Breathing exercises are particularly beneficial for patients who hold their breath when they develop fear or anxiety during a dental procedure. If a patient stops normal breathing, blood oxygenation is decreased, which can cause fatigue and anxiety and increase the apprehension experienced by the patient [24]. Good breath regulation is also necessary to gain the maximum benefit from guided imagery experiences.

Three basic breath exercises that may be incorporated into a treatment plan are diaphragmatic breathing, complete breathing, and ujjayi breathing:

- Diaphragmatic breathing (or belly breathing): Instruct the patient to breathe in through the nose and out through the mouth, focusing only on the rise and fall of the belly (not the whole rib cage). Challenge the patient to expand the belly as far as possible as he or she inhales. It may help for the patient to put his or her hand on the belly to concentrate on this motion.
- Complete breathing: For this exercise, the patient should begin with the belly breath. When the stomach expands as far as it will go, teach the patient to inhale through the nose again and concentrate on the air coming into and fully expanding the rib cage. There are two variations on the release: either a slow, steady release, which helps promote tranquility and mindfulness, or a sudden, rapid release, which can help the patient experience how good “letting go” can feel.

- Ujjayi breathing (“ocean breathing” or “Darth Vader breathing”): This breath, which is effective as an affect regulator during moments of high stress or intensity, is a noisy in-through-the-nose, out-through-the-nose technique. This allows for a greater flow of oxygen into the lungs, which can stimulate a relaxation response. For patients who are not used to mindful breathing, it is especially important to start slow with this exercise, doing no more than five breaths at a time. Let the patient know that the louder this breath sounds (even if he or she feels self-conscious at first), the better it is likely to work.

These techniques have the best chance of success among patients who have mild-to-moderate dental fear or anxiety; they will have little benefit for those with dental phobias. Clinicians should be willing to learn about these techniques and spend the additional time required to implement them, when necessary, into their practices. Some techniques may be combined to maximize the benefit.

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## PHARMACOLOGIC MANAGEMENT OF DENTAL FEAR AND ANXIETY

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Patients who are unable to undergo dental treatment due to excessive fear, anxiety, or phobias and who do not respond to dental behavior modification techniques require pharmacotherapy. Oral, inhalation, or intravenous sedation can help these patients receive dental care. The use of sedation medications should only be employed to the extent that they are compatible with the patient’s medical history and will not cause adverse drug interactions with any other prescription or over-the-counter medication used by the patient. Patients should be advised, as part of an informed consent process, that the use of any medication entails risks. In susceptible patients, medications used for sedation can cause anaphylactic reactions, adverse drug interactions, seizures, respiratory depression, and even death.

While these reactions are rare, patients should be advised of their possibility. This section will focus on oral and inhalation sedation.

## ORAL SEDATION

### General Considerations

In recent years, the dental profession has advertised and marketed “sleep dentistry” as a means for patients with high levels of dental apprehension to receive dental treatment. In the United States, this is most commonly achieved by oral sedation [25]. Patients who receive oral sedation from a general dentist should only be titrated to levels of minimal-to-moderate sedation. Minimal sedation refers to a minimally depressed level of consciousness in which the patient can independently and continuously maintain a patent airway and can respond normally to tactile sensation and verbal commands [26]. Respiratory and cardiovascular functions remain normal, and there is no intent for the patient to lose consciousness. Moderate sedation is a deeper level of sedation in which the patient still responds purposefully to verbal commands but may need slight tactile stimulation to do so [27]. General dentists should not seek to place patients in a state of deep sedation, as the patient’s ability to maintain a patent airway can be impaired.

Dental clinicians who use any medication to achieve patient sedation should be trained in the appropriate use, the initial and maximum dosage, and possible adverse effects of the drugs in use. Prior to administration, the clinician should take into account the patient’s medical history, age, weight, and concurrent use of other medications. Certain medications (e.g., opioid analgesics, antidepressant medications, antipsychotic medications, antihistamines) can potentiate the effects of oral sedation agents. The use of nitrous oxide/oxygen inhalation sedation concurrently with oral sedation can also potentiate the effect of an oral sedative, and some states require a special permit if oral and inhalation sedation are combined.

Individual state regulations and requirements vary as to the level of training required for dentists and dental staff involved in caring for patients who are given oral sedation. Some states require the use of equipment to monitor vital signs for the duration of the sedation. Further, training in cardiopulmonary resuscitation may be required at the Advanced Cardiac Life Support level (rather than the Basic Life Support level) for dentists and the entire staff. Most states require that an automated external defibrillator be present in the dental office and that all staff members be trained in its use. Staff members should be aware of the location of the emergency kit, used if a medical emergency occurs. The use of a medication that is appropriate for the given medical emergency is the responsibility of the dentist. Periodic mock emergency drills in which staff members are assigned a specific role increase the chance of an appropriate staff response and survival of the patient.

### Common Medications

A universally ideal sedative medication does not exist; each sedative has its advantages and disadvantages, indications and contraindications. Benzodiazepines are most commonly used in dental practice for oral sedation. The agents used most often include diazepam, triazolam, and lorazepam.

### *Diazepam*

Diazepam was invented in 1963 and was the successor to the first benzodiazepine, chlordiazepoxide [29]. Today, diazepam is approved for the treatment of anxiety disorders, acute alcohol withdrawal, and skeletal muscle spasms. When diazepam is used to manage dental fear and anxiety, the dosage and schedule will vary according to the medical history, of the patient’s age and weight, the degree of sedation desired, and the concurrent use of any other medication. The usual adult dose is 2–10 mg the night before the appointment and 2–10 mg one hour before the appointment. Diazepam is a highly lipophilic molecule with 100% oral bioavailability.

It has a rapid onset of action (20 to 40 minutes after administration), and plasma levels peak one to two hours after its administration [30]. These favorable pharmacokinetic properties are countered by a long half-life, or the time required for the blood-plasma concentration of the medication to be reduced by one-half. The half-life of diazepam can range from 20 to 100 hours due to its production of active major metabolites, such as desmethyldiazepam [31]. This extended half-life can make patients feel sleepy for a few days after its administration. Patients should not drive, operate machinery, or perform any task that requires intense concentration or decision making during this period. Diazepam is metabolized by the liver, so hepatic dysfunction and older age can decrease its metabolism and prolong plasma concentration [32]. At the anxiolytic doses used for dental treatment, diazepam is a moderate tranquilizer that causes drowsiness and some loss of anterograde (short-term) memory [33]. Because of this effect, the patient may remember little or nothing of the dental procedure.

Alcohol can potentiate the central nervous system (CNS) depressant effects of diazepam, so patients should be advised to refrain from consuming alcoholic beverages when this drug is being used. Diazepam has been assigned as pregnancy risk category D by the Food and Drug Administration (FDA), which indicates that there is potential for fetal harm if it is used during pregnancy. For these patients, a different agent should be used or dental treatment should be postponed until after delivery.

Dental clinicians should avoid the simultaneous use of narcotic analgesics and diazepam, as the synergistic combination of these medications can potentiate CNS depression. Patients who have used diazepam should have a responsible adult drive them to and from their appointment.

### **Triazolam**

Triazolam is a benzodiazepine frequently used for the treatment of short-term insomnia, but it has become a popular medication for the oral sedation of apprehensive dental patients. A sublingual formulation is available with very rapid onset of action (i.e., within 30 minutes of administration). The peak blood plasma concentration occurs approximately 75 minutes after the initial dose, with a bioavailability of 44% with conventional tablets or 53% with the sublingual formulation [34]. It is not available in intravenous or intramuscular formulations. Triazolam has muscle relaxant, hypnotic, sedative, and amnesic properties, which can reduce memories associated with the unpleasant aspects of dental treatment [35].

The initial dose of triazolam is 0.125–0.375 mg one hour before the appointment, with a second incremental dose at two hours into treatment (for longer procedures). A 0.5 mg maximum cumulative dose is allowed per treatment session. Compared with diazepam, triazolam has a much shorter half-life (1.5 to 5 hours), as it does not produce active metabolites that perpetuate its clinical effect [36]. These pharmacokinetic properties make it an ideal oral sedative for patients undergoing dental procedures of short-to-intermediate length. Although triazolam has many beneficial qualities for oral sedation, its use is not without risk. The FDA has assigned triazolam pregnancy risk factor X, which indicates that studies have demonstrated fetal abnormalities or fetal risk that outweighs any benefits of its use [37]. As such, this agent is contraindicated in pregnancy.

Alcohol and other sedative medications can potentiate the effects of triazolam and should not be used concurrently with this medication. The patient's physician should be consulted about the simultaneous use of other medications for chronic anxiety or depression to determine if their combination is appropriate.

Some medications used in the treatment of oral infections can also have adverse interactions with triazolam. Theazole antifungal agents ketoconazole and itraconazole, which are used to treat the intraoral candidiasis, can prolong the duration of the effect of triazolam. Macrolide antibiotics (e.g., erythromycin, clarithromycin) to treat odontogenic bacterial infections can increase the blood plasma levels of triazolam and amplify its effect [38]. Triazolam should not be used as an anxiolytic medication if the patient is utilizing these antifungal or antibiotic medications.

### **Lorazepam**

Lorazepam is an intermediate-acting benzodiazepine with a half-life of approximately 10 to 20 hours—longer than triazolam, but shorter than diazepam. This property makes lorazepam a good choice for patients who are undergoing longer dental procedures. The usual adult dose for oral sedation is 0.5–4 mg two hours before dental treatment; another dose may be taken the night before the appointment for those patients whose anxiety will interrupt their sleep [39].

The onset of action begins within 60 minutes of administration, with peak plasma levels achieved within one to two hours. Lorazepam has antianxiety, hypnotic, amnesic, and muscle relaxant properties. It uses phase II hepatic metabolism, resulting in quick elimination of inactivate metabolites by the kidneys [30]. Thus, the metabolism of lorazepam is less influenced by alterations in hepatic function. Lorazepam is considered pregnancy risk factor D and should be avoided in pregnant patients. Alcohol and CNS depressant medications should not be used simultaneously with lorazepam.

### **INHALATION SEDATION**

The discovery of nitrous oxide and its use in dentistry predates oral anxiolytic medications [41]. The inhalation of 100% nitrous oxide can lead to hypoxia and death; therefore, it is combined with oxygen in modern delivery systems. Nitrous oxide/oxygen can cause relaxation of the facial musculature, which can have the semblance of a grin or smile, hence the term “laughing gas.” This popular phrase may suggest a benign substance without any adverse effects, but it is an inhaled drug and all patients should be monitored carefully while it is administered. Individuals who have abused this drug for recreational purposes have developed serious health problems, including death. All clinicians who use nitrous oxide/oxygen as an anxiolytic for apprehensive patients should be trained in its use, contraindications, potential adverse effects, and appropriate monitoring procedures.

Nitrous oxide/oxygen combination can be used as a single anxiolytic agent or may be combined with oral anxiolytic medications. The use of combined oral medications and nitrous oxide/oxygen is governed by various state regulations pertaining to mandatory training, emergency preparedness requirements, maximum doses, and the age of the patient.

Nitrous oxide/oxygen decreases pain, anxiety, and the memory of the dental treatment. It does not replace a local anesthetic, but it can relax a patient so he or she is more receptive to it. The onset of action can begin in as little as 30 seconds, with the peak effect occurring in about five minutes. Upon completion of the dental procedure, delivery of 100% oxygen for five minutes eliminates the nitrous oxide from the body. As opposed to oral anxiolytic medications, nitrous oxide/oxygen is not metabolized by the body [42]. Modern delivery units include a flowmeter that will stop the flow of nitrous oxide if the ratio of nitrous oxide to oxygen exceeds 70%/30% as a safeguard to prevent hypoxia [43].

The exact ratio can be customized to the needs of the patient, with the concentration of nitrous oxide usually ranging from 25% to 50%. There are relatively few side effects from nitrous oxide/oxygen sedation, with nausea and vomiting being the most common. Absolute contraindications for the use of nitrous oxide/oxygen include emphysema, pneumothorax, middle ear surgery, and an air embolus [44]. The use of nitrous oxide/oxygen in pregnant patients has been controversial. Short-term use at low concentrations may be appropriate if dental treatment cannot be delayed. There have been reports of infertility, congenital abnormalities, and spontaneous abortions following prolonged occupational exposure, which is more of an issue for dental staff members than patients [31]. The patient's obstetrician should be consulted before nitrous oxide/oxygen is used during pregnancy.

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## DENTAL TREATMENT MODIFICATIONS

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While the actual techniques for restorative, surgical, prosthetic, and periodontal procedures are exacting and can bear little if any modification themselves, the manner in which they are delivered and the atmosphere in the office can be modified to decrease patients' fear and anxiety. These techniques will prove beneficial for patients who are sedated and those who are not.

Patients with known dental fear and/or anxiety should be scheduled for appointments as early in the morning as possible, as this will minimize their opportunity to dwell upon the source(s) of their apprehension. Upon arrival at the office, patients should be greeted warmly, escorted to the treatment area promptly, and made to feel welcome by the dental assistant and the dentist. It is important that patients are not left to wait by themselves for an extended period after they are seated, as this will also provide an opportunity to contemplate the situations and items that are a source of their dental

fear, anxiety, or phobia. This can be amplified if they hear patients in the adjacent operatory complain of pain or discomfort during a dental procedure. Because some patients will feel vulnerable in a completely supine position, a semi-reclined position may be used for the procedure (or an upright position if impressions are required) to reduce feelings of vulnerability and helplessness. If a patient feels unable to communicate pain or discomfort with the dental staff during anesthesia, when a rubber dam is placed to isolate a tooth, or when dental instruments occupy much of the oral cavity, a prearranged hand signal can serve to communicate this need and ameliorate the patient's concerns.

The tell-show-do technique can also decrease patients' fears about unfamiliar dental procedures [46]. This involves telling the patient what will be done, showing a diagram or video of the actual procedure, and then finally doing the procedure. Any explanations should be given in terms the patient understands and at a pace that allows for absorption of the information.

Because the sight of dental instruments can be a source of apprehension, they should remain out of the patient's line of vision as much as possible. Placing instruments on a bracket stand behind the patient and delivering them to the clinician without being seen by the patient will help decrease these fears.

A patient's apprehension will increase if the he or she believes the clinician is having difficulty with a procedure. For example, a clinician with minimal experience with oral surgery should not attempt a difficult surgical procedure on any patient, especially those who are apprehensive about dental treatment. Clinicians should confront the limits of their clinical skills and should refer patients who require procedures that are beyond their expertise to another practitioner or to a specialist who can ensure the patient is treated appropriately and comfortably. A positive dental experience and outcome may give apprehensive patients the confidence to return for future treatment.

## THE EMOTIONAL ASPECT OF TREATING APPREHENSIVE DENTAL PATIENTS

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The demands of practicing dentistry are numerous, and this can take a toll on all members of the dental staff. The ability to successfully treat apprehensive dental patients is rewarding, but the cumulative stresses of addressing these patients' fear and anxiety can lead to compassion fatigue [47; 48]. Compassion fatigue is comprised of two components: burnout and vicarious traumatic stress [51]. The first component consists of characteristic negative feelings such as frustration, anger, exhaustion, and depression. The second component, vicarious traumatic stress, may result when the professional is negatively affected through vicarious or indirect exposure to trauma through their work.

Compassion fatigue can be insidious in its development, taking months or years to develop. Each individual's susceptibility to compassion fatigue is different, with some clinicians exhibiting no or minimal levels while others suffer personal and professional repercussions that can compromise their professional abilities and impact their quality of life. The cumulative exposure to apprehensive dental patients, the emotional energy expended to maintain their comfort, pressure to complete the dental procedure quickly and effectively, and the need to maintain a reassuring and confident demeanor can lead to emotional exhaustion. General signs of compassion fatigue include feeling anxious or developing a sense of dread when treating dental patients or feeling unusually tired or exhausted after completing procedures that had not previously evoked this response. It is beyond the scope of this course to explore all of the emotional and psychological experiences of the dental staff as they provide treatment for patients, apprehensive or otherwise. However, dental staff members should be cognizant that these problems can arise and adversely affect all aspects of

their lives, including their ability to provide dental care. Professional intervention should be sought to address and rectify these emotional or psychological problems if they are identified in a staff member.

Essential to preventing and treating burnout and compassion fatigue is creating and maintaining a healthy balance in one's life [34]. This balance may be different from individual to individual and within a given individual over time. Common components to achieving balance and optimal functioning involve the following basic self-care strategies: taking time off work periodically to rejuvenate oneself; building in time in one's schedule to attend to one's own needs; regular exercise, keeping one's body healthy, and attention to one's overall health; getting enough sleep on a regular basis; and eating healthy foods regularly and maintaining a healthy weight. Dental professionals who do not attend to these basic strategies are more likely to be physically and emotionally vulnerable and less resilient over time.

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## CONCLUSION

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Dental treatment can provoke a primal fear in patients to the extent that they only seek dental care when pain or swelling leaves them no other choice. This course has provided an introduction to the varying levels of dental apprehension experienced by patients, including common origins, triggering objects or situations, and options for management. Treating apprehensive patients with behavior management techniques and/or pharmacotherapy may allow patients who would neglect their dental care to engage in treatment. Clinicians should select the appropriate management technique(s) most appropriate for each patient. The process of treating apprehensive patients over an extended period of time can be emotionally and psychologically stressful for staff members. A dental team that maintains ideal physical, emotional, and psychological health will be best prepared to meet the treatment needs of all patients, including those who are fearful or anxious.

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