

## REVIEW ARTICLE

# Management of Dental Anxiety among Patients

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## ABSTRACT

Fear of dental treatment and anxiety about dental procedures are prevalent and have an impact on the oral health-related quality of life and the quality of treatment performed. Dental anxiety is often reported as a cause of irregular dental attendance, delay in seeking dental care, or even avoidance of dental care. Dental anxiety varies in intensity from patient to patient. The present review article has highlighted the possible types of dental fear and anxiety, their origins in dentistry, and current knowledge on management of patients with dental anxiety. If dentists are aware about the level of anxiety among their patients, they can anticipate patient's behavior and be better prepared to take measures to help alleviate anxiety which eventually will help them to treat their patients better.

**Keywords:** Dental anxiety, Dental fear, Therapies and management.

**How to cite this article:** Badiyani BK, Kumar A. Management of Dental Anxiety among Patients. *Int J Oral Care Res* 2017;5(4):317-322.

**Source of support:** Nil

**Conflict of interest:** None

## INTRODUCTION

The terms of dental anxiety (appreciated by self-report scales) and/or dental phobia (described by criteria present in psychiatric manuals) are often used as synonyms referring to the same problem. It is about a patient having a severe anxiety regarding dental care and a behavior pattern of avoiding dental interventions.<sup>1</sup> Odontophobia (dental fear) is a "unique phobia with special psychosomatic components that impact on the dental health of the odontophobic persons."<sup>2</sup> For some individuals, dental fear may be so great that normal life is impaired. In these instances, the individual experiences fear or anxiety, i.e., out of proportion to the actual danger present in the situation. This often leads to avoidance behavior, and clinically significant levels of distress or impaired functioning.<sup>3</sup> Such avoidance behavior is well known by any

dentist who has treated patients with high levels of dental fear before. The overall effect of dental fear and anxiety appears to be multifaceted, such that the individual not only avoids their dental appointments but also tends to have worse oral health.<sup>4,5</sup> Dental fear may be distinguished from dental anxiety by the situational boundaries within which it occurs. Fear is generally regarded as a physiological, behavioral, and emotional response to a feared stimulus, whereas anxiety is a feeling of dread or worry focused on, yet temporally prior to, exposure to a feared stimulus. Fear and anxiety are highly related and are often used interchangeably in the fear literature.<sup>6</sup>

## CLASSIFICATION OF ANXIOUS DENTAL PATIENT

Weiner and Sheehan<sup>7</sup> have suggested that dentally anxious people could be classified into two groups, exogenous and endogenous, with respect to the source of their anxiety. In the former, dental anxiety is the result of conditioning via traumatic dental experiences or vicarious learning, while in the latter, it has its origins in a constitutional vulnerability to anxiety disorders, as evidenced by general anxiety states, multiple severe fears, and disorders of mood.<sup>7</sup>

## THE VICIOUS CYCLE OF DENTAL FEAR

Individuals with dental fear represent a particularly difficult population to treat and present special challenges to dental staff in terms of the management of care. Armfield et al<sup>8</sup> gave the model of the vicious cycle of dental fear as in Figure 1. The sequence of the "vicious cycle" of fear

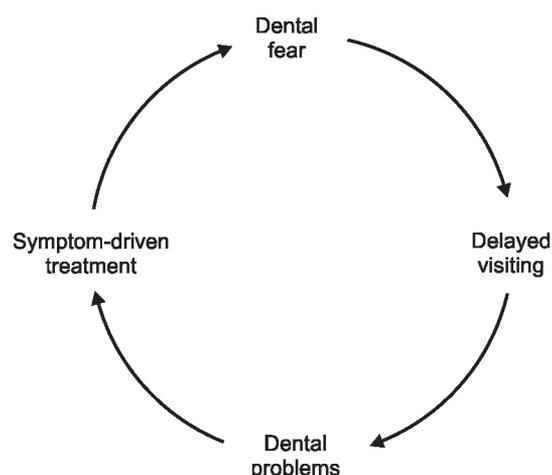


Fig. 1: Model of the vicious cycle of dental fear

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shows that dental fear, delayed dental visiting, increased dental problems, and symptom-driven treatment form a linked chain feeding back into the fear experience and that a concerted effort is required to break this vicious cycle of dental fear and provide assistance to those individuals with established fear-avoidance patterns.

## ETIOLOGY OF GENERAL FEAR AND ANXIETY

### Genetic Vulnerability

Individuals with specific phobias, including odontophobia, may have inherited genetic vulnerability factors that predispose them to anxiety in general or certain phobias specifically. While individuals with dental phobia do not directly inherit the phobia itself, genetic vulnerability factors may interact with other etiological elements that cause the phobia.<sup>9,10</sup>

### Negative Affectivity/Anxiety Vulnerability

Negative affectivity refers to a vulnerability to experiencing negative emotional states. Negative affectivity appears to be a stable personality trait that predisposes individuals to a range of psychological disorders, including phobia.<sup>11</sup> The relationship between negative affectivity and dental phobia has not yet been established.<sup>5</sup>

### Preparedness

Through the process of natural selection, individuals who readily acquired fear and avoidance responses to genuinely dangerous situations (e.g., dangerous animals, storms, heights, small spaces, etc.) have passed on this tendency to their progeny.<sup>12</sup> As such, the human species is “prepared” to more readily acquire fear reactions to stimuli that may have posed a genuine danger to our ancestors.<sup>12,13</sup> Dental phobia may be part of an evolutionarily beneficial tendency to protect the body envelope from intrusion by foreign (nonnutritional) objects.

### Cognitive Conditioning (Pavlovian)

Pavlovian or classical conditioning refers to the process by which a previously neutral stimulus acquires the ability to directly elicit a response through pairing this stimulus with another unconditioned stimulus that elicits the same response.<sup>14-17</sup> For example, an individual who experiences a painful procedure (and the unconditioned response of anxiety/fear) during a dental visit may acquire a conditioned association between the dentist (the conditioned stimulus) and anxiety/fear (the conditioned response).<sup>18-21</sup> Re-presentation of the conditioned stimulus (the dentist or related stimuli) is then able to elicit the conditioned response of anxiety during the patient’s next dental consultation.

## Operant Conditioning

Operant conditioning refers to a process whereby the frequency of a particular behavior (“operant”) is modified through the consequences that follow the behavior. Certain behaviors may be “reinforced” (i.e., increased in frequency) through their association with positive consequences (“positive reinforcement”) or through the removal of negative consequences (“negative reinforcement”).<sup>14,18,19,22,23</sup> Alternatively, behaviors may be “punished” (i.e., reduced in frequency) if they lead to negative consequences (“positive punishment”) or the removal of positive consequences (“negative punishment”).<sup>22</sup> For phobias, the process of positive punishment (e.g., pain and anxiety that occurs during a visit to the dentist) and negative reinforcement (e.g., the reduction in anxiety that results when the individual avoids the dentist) is thought to be most important, and these comprise Mowrer’s two-factor model of phobia acquisition and maintenance.<sup>24</sup>

### Vicarious

In addition to direct contributors to phobia acquisition, Rachman<sup>25</sup> proposes that individuals may also acquire phobic responses indirectly. One such pathway has been called vicarious experience or vicarious conditioning. In vicarious conditioning, the individual acquires a fear response through seeing the fearful experience of others. In dental phobia, for example, a child who observes a fear response of a parent attending the dentist may learn indirectly that the situation poses a significant threat.

### Verbal Threat

Rachman<sup>20</sup> proposed a second indirect pathway to phobia acquisition referred to as “verbal transmission”. In this process, the individual acquires a fear or phobia through learning about the dangerousness of a situation from others without observing it directly.<sup>20</sup> In dental phobia, for example, an individual may hear stories from others about traumatic or painful experiences that they have had during dental treatment, which may lead to a learned fear of dental procedures.<sup>26</sup>

### Cognitive Content

There are a range of cognitions that have been identified as important in the acquisition and maintenance of anxiety disorders, including specific phobias. These include a set of ideas about the probability (e.g., “If I go to the dentist it will definitely be painful”) and severity (e.g., “If I go to the dentist the pain will be excruciating”) of negative outcomes.<sup>27</sup> Additionally, individuals may hold beliefs about their inability to cope in the face of an aversive outcome (e.g., “If I am in pain at the dentist, it will be unbearable”).<sup>28</sup>

## Cognitive Biases

In addition to the content of cognition, phobias are associated with biases in the process of cognition.<sup>27</sup> For example, individuals with anxiety disorders, such as phobias are known to have memory biases in which memories of threat-consistent experiences and information are more readily retrieved.<sup>29</sup> Although the link between cognitive bias and dental fear and anxiety is plausible, no research has yet been done to confirm this.

## PATHWAYS RELATED TO DENTAL FEAR AND ANXIETY

There are five pathways that are thought to specifically relate to dental fear and anxiety as shown in Figure 2. These five pathways are discussed further in this article but it is important to note that a single or a combination of background factors disused in the etiology of general fear and anxiety may affect these pathways.

### Conditioning Pathway

Conditioning is a process where the participant learns through personal experience that the event or stimulus heralds a detrimental outcome.<sup>30</sup> In 1927, Pavlov<sup>16</sup> published his seminal paper on "Conditioned Reflexes." Rachman<sup>25</sup> then successfully demonstrated that physiological responses, such as sweating and increased heart rate, occur when individuals experience fear. Such responses are evident in odontophobic patients. Thus, it can be proposed that the majority of dental fears are reactions to stressful experiences that provoke anxiety in the individual and the conditioning pathway appears to be the most commonly utilized pathway by patients.<sup>20</sup>

### Informative Pathway

The informative pathway is another indirect pathway for fear acquisition, which does not require the presence of an

unconditioned stimulus. As far back as 1977, Rachman<sup>20</sup> discussed the relevance of the informative pathway in so much as child-rearing involved information giving. He noted that the instructional process of child rearing may lead to biases for commonly encountered fears. Such a dynamic could help explain childhood dental anxiety, where children learn to fear the dental environment from dental phobic elders, negative connotations advertised by media (e.g., television, movies), and friends with personal negative experiences.

### Vicarious Pathway

The vicarious pathway is an indirect pathway for fear acquisition that does not require the presence of an unconditioned stimulus. It has been acknowledged in the literature that people with extreme dental fear avoid the dentist.<sup>31,32</sup> In a recent study using Armfield's Index of Dental Anxiety and Fear (IDAF), it was found that participants who indicated extreme dental fear were marginally more likely not to undertake an oral examination, here females exhibited significantly higher dental fear than males.<sup>31</sup> By utilizing this vicarious pathway, it is plausible to suggest that vicarious learning could be contributing to pediatric fears, whereby expressions of fear by elders at the dentist in front of children lead to fear acquisition in the children.<sup>33</sup>

### Verbal Threat Pathway

The verbal threat pathway presents another indirect pathway for fear acquisition that does not require the presence of an unconditioned stimulus. Research<sup>34</sup> has suggested that emotions arise because of three factors: Verbal cognition, behavior changes, and physiological states. This "emotion" is known as the "tripartite" and appears to govern onset and origin of fears generated by the verbal threat pathway.<sup>34,35</sup> One interpretation of the verbal threat pathway is that fear is induced when an authority figure threatens an individual with a painful experience. In the case of dental fear, painful and/or negative experiences are linked to dental visits. Although perhaps within strict psychological terminology, the informative and verbal threat pathways are similar. Within odontophobia the two pathways differ in that the verbal threat pathway occurs when a "visit to the dentist" is literally used as a form of punishment for bad behavior. This does not occur in the informative pathway.<sup>5</sup>

### Parental Pathway

The concept of parental modeling is supported by research demonstrating that children's fear was positively related to their mother's dental fear.<sup>36</sup> Specifically, mothers who expressed heightened levels of fear in front

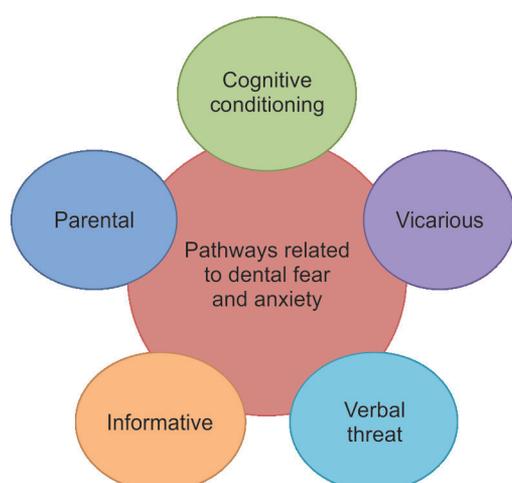


Fig. 2: Pathways related to dental fear and anxiety

of their children were more likely to have fearful children. Conversely, mothers who did not frequently express fear had less fearful children.<sup>36</sup> These findings are consistent with another study showing that most adults attributed the origin of their fears to informative and vicarious factors occurring in childhood more so than to cognitive model events.<sup>37</sup> However, one must note that any relationship between parent and child fears may also be due to the informative or vicarious pathways because they are all linked in some way. However, within odontophobia, individuals utilizing the parental pathway had their sole influence of odontophobia from their parents' expression of fear, whereas the vicarious pathway is multifaceted.<sup>5</sup>

**MEASUREMENT INSTRUMENTS OF DENTAL FEAR AND ANXIETY**

As dental fear can be difficult to define and measure effectively, research began to create a more practical, reliable, and theoretically efficacious dental fear measurement.<sup>5</sup> The most commonly used measuring instruments are: The Index of Dental Anxiety and Fear (IDAF-4C+), developed by Jason Armfield, Corah's DAS (1969), Kleinknecht's Dental Fear Survey (DFS, 1973), Stouthard's Dental Anxiety Inventory Short-Form (DAI-S, 1993), the Modified Dental Anxiety Scale (MDAS, 1995), and Hierarchical Anxiety Questionnaire (HAQ, 1999).<sup>5,38</sup>

**DIAGNOSTIC CATEGORIES OF DENTAL FEAR AND ANXIETY**

Individuals who are classified as "dentally anxious," tend not to have qualities that can be catalogued. A group of researchers, well known for their clinical experience, developed a richer, more detailed classification system for dental fear. Their system, known as the Seattle System, mirrored the origin and the main stimuli of fear surrounding dental anxiety and phobias.<sup>39,40</sup> The Seattle System consists of four diagnostic elements: (1) Simple Conditioned Stimulus of specific dental stimuli; (2) anxiety about somatic reactions during dental treatment; (3) patients with a generalized anxiety state and multiphobic symptoms; and (4) distrust of dental personnel (Table 1). Despite the fact that the classification was originally designed for pragmatic academic purposes, it has shown to hold some evidence of psychologically valid identifications of dental anxiety subtypes.<sup>5</sup>

**MANAGEMENT TECHNIQUES FOR DENTAL FEAR AND ANXIETY**

**Individual Systematic Desensitization and Group Therapy**

Individual systematic desensitization is a behavioral therapy whereby individuals are gradually exposed

**Table 1:** Seattle system diagnostic criteria for dental phobia

<i>Fear type</i>	<i>Diagnostic item</i>	<i>Classification of fear</i>
Type I	Fear of dental procedures	Simple conditioned phobia
Type II	Fear of fainting, panic attack, heart attack	Fear of catastrophe
Type III	Nervous person in general	Generalized anxiety
Type IV	Distrust of dentists	Fear of dentists
Subclass a		High fear of dental procedures
Subclass b		Generally anxious
Subclass c		Fearful of dental catastrophes

or incrementally exposed to fearful stimuli. In this process, the individual must first identify and accept the fear-related stimulus; second, the individual must learn to employ a relaxation or coping technique; and finally, the individual must utilize the learned relaxation or coping strategy to react and overcome the fearful stimulus.<sup>41</sup>

**Flooding/Implosion**

Flooding is a form of desensitization for treating phobias when the patient has a directly conditioned origin of fear. In flooding therapy, the patient is subjected to repeated exposure of fear-inducing stimuli until they no longer show a fear response, causing termination of the fear response. Implosion is used for either indirect conditioned or nonconditioned origins of fear that may be imagined.<sup>42</sup>

**Cognitive Behavioral Therapy**

Cognitive behavioral therapy (CBT) is a psychotherapeutic approach to address dysfunctional emotions and negative behaviors and cognitions using a series of goal-oriented sessions. Current research appears to support CBT and relaxation therapy for treatment of directly conditioned fears.<sup>43</sup>

**Relaxation Therapy**

Relaxation therapy is a diverse set of practices aimed at eliciting a relaxation response, including a reduction in overall physical arousal symptoms. The phobic individual implements a particular mental relaxation technique (e.g., slow breathing, counting, relaxation swallowing) to reduce stress.<sup>44</sup> Results seem to suggest that CBT is more effective but should be combined with parental guidance in treatment of pediatric dental fear. Extrapolating this data, a combination of CBT and relaxation guidance may provide effective treatment of parental modeling dental fears.<sup>5</sup>



## Computer-assisted Relaxation Learning

A recent development in the treatment of dental fear, computer-assisted relaxation learning (CARL) is a self-paced treatment for dental phobic individuals for treating needle phobia. The program begins by introducing its purpose, followed by activities and videos on how to cope with their fear. However, as CARL is self-paced, it may perhaps aid in treating patients who wish to learn to cope without therapists, thereby improving access to oral health care.<sup>45</sup>

## Hypnotherapy

Perhaps one of the least understood treatments for dental fear is hypnotherapy. Hypnotherapy attempts to create a state of unconscious change, whereby the individual forms new responses, attitudes, and behaviors to previously feared stimuli.<sup>46</sup>

## Pharmacological

The use of nitrous oxide (NO) and benzodiazepines in dentistry has long been employed to reduce anxiety. Nitric oxide has often been compared with the effectiveness of CBT and relaxation therapies. For example, Willumsen et al<sup>47</sup> reported no significant differences between NO and CBT or applied relaxation therapy. They suggested that in the short term, either treatment was effective. However, research is required to determine whether certain origins of fear and pathways are more receptive to pharmacological agents than others are.<sup>5</sup>

## CONCLUSION

Dental anxiety is seemingly familiar, prevalent phenomena. The management techniques mentioned in this article should be individualized depending on the severity of the anxiety the patient manifests. The dentist can also advise his patient to consult for further talking therapies if required. The dentist should motivate his anxious patients to overcome dental anxiety so as to improve overall well-being, quality of life, as well as their oral health-related quality of life.

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