



## UNDERSTANDING AND ADDRESSING PEDIATRIC DENTAL ANXIETY: A CONTEMPORARY OVERVIEW

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### ABSTRACT

Dental anxiety in children poses a serious obstacle to dental care, impacting children's experiences and general well-being. It is the result of a complicated interplay between learned behaviors shaped by parental attitudes, psychological characteristics like shyness and fearfulness, and genetic predispositions. These fears are exacerbated by traumatic dental experiences, which might result in skipping out on important dental care and even developing problems with oral health. Neurobiologically, brain circuits involving the prefrontal cortex and amygdala regulate fear reactions, and hereditary variables impact individual differences in anxiety levels. A complete strategy is needed to effectively manage dental anxiety in children, one that incorporates behavioral approaches, cognitive-behavioral therapy (CBT), parental engagement, and, if needed, pharmaceutical interventions including general anesthesia or nitrous oxide sedation. In order to achieve long-term oral health outcomes, these tactics seek to reduce fear, enhance patient cooperation, and promote happy dental experiences. In summary, improving children's oral health and quality of life requires treating pediatric dental anxiety. In order to lessen the widespread effects of dental fear and guarantee that children can receive quality dental care, more research and customized interventions must be put into place.

**KEY WORDS:** Pediatrics, Fear, Anxiety, Management.

### INTRODUCTION

The most prevalent and normal emotion that people feel is fear. It reorganizes the functions of all body organs, awakens the neurological system, and releases the body's stored energy. This causes a sharp rise in heart rate, dilated pupils, and a halt in activity. Simultaneously, the adrenal gland secretes a surge of adrenalin that causes veins to constrict, removing blood from skin cells. Fear causes

changes in the nervous system's function as well as variations in blood pressure. This occurs in response to a perceived threat <sup>(1)</sup>. The sense of concern, fear, or nervousness combined with behavioral, cognitive, and bodily symptoms is referred to as anxiety. An occasional feeling of anxiety is normal and can even be adaptive if it helps one become more ready for unfamiliar situations. Anxiety symptoms can turn pathological if they are extreme, prolonged, or interfere with daily functioning.

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A number of anxiety disorders are known. Excessive worry across a variety of domains, together with accompanying somatic symptoms that last for at least half a year and cause clinically substantial discomfort or functional impairment, are characteristics of generalized anxiety disorder. Unexpected and frequent panic attacks, along with at least a month of continuous fear about having another panic attack or experiencing major behavioral changes as a result of the attack, are the hallmarks of panic disorder <sup>(2)</sup>.

The etiology of dental anxiety and panic in children is intricate and complicated. Anxiety and fear can arise in the dental care setting due to a number of interrelated factors, both environmental and internal. It has been established via prior research that shyness and general fearfulness/immaturity are important psychological traits. It is possible to develop dental anxiety and worry through cognitive processes as well as by hearing negative attitudes from parents or other adults <sup>(3-5)</sup>.

Children who experience this phobia may have three main outcomes: they may use dental services less frequently than necessary, they may not be able to receive some important dental procedures, and they may not cooperate when seen by a dentist. Put another way, dental fear can negatively impact a child's psychological health, quality of life, oral health, and overall health, which can lead to serious health issues <sup>(6,7)</sup>. It is essential to comprehend dental fear and anxiety in early childhood in order to reduce the children's apprehension and worry before to and during surgery, as well as to control the behavior of the young patients. Good behaviors like smiling and talking can be displayed by children who are both at ease and nervous. On the other hand, fearful children can react cautiously or cautiously; in extreme cases, they might even physically defend themselves and interfere with treatment <sup>(8)</sup>. As a result, this paper will attempt to discuss the current causes, difficulties, and remedies for handling children's anxiety and fear.

## MECHANISM

A common belief is that subcortical brain regions have an inbuilt ability to elicit fear. This perspective is based on the theory that some basic, generally expressed emotions are acquired by humans from animals and are sometimes referred to as products of the limbic system. For instance, the limbic region known as the amygdala is commonly described as the source of dread and as a "fear center" or, to use more modern language, the center of a fear circuit<sup>(9,10)</sup>.

By means of connections to the central amygdala nucleus, the lateral amygdala nucleus is activated by an immediate danger, which in turn triggers the expression of defensive behavioral behaviors, including freezing, and promotes defensive physiological reactions. Furthermore, avoidance and other protective behaviors are regulated by connections made between the lateral amygdala, basal amygdala, and the nucleus accumbens. Certain cortical regions influence the circuits' capacity to regulate defensive responses and activities, even if the majority of their components are subcortical. For instance, links between the amygdala and the ventral medial prefrontal cortex and hippocampus control the extinction of defensive reactions brought on by learnt dangers <sup>(9)</sup>.

### Reasons of fear from Dentistry:

1. Genetic factors: Fear is a protective mechanism that triggers fast coordinated physical and behavioral reactions to stimuli in the environment that the brain has learned to perceive as possibly threatening due to experience and heredity. Personal characteristics, such as gender, temperament, IQ, degree of schooling, and so forth, might influence how and to what extent youngsters fear the dentist. According to a genome-wide association study by Y Zhou and D W McNeil using gene enrichment analysis, genome-wide scanning, and heritability analysis, fear and anxiety connected to dental

care may be partially accounted for by genetic variables<sup>(10-12)</sup>.

Cameron L. Randall et al.<sup>(13)</sup> in 2016 illustrated the shared heritability of dental fear and pain phobia, providing evidence in favor of the claim that genetic variation plays a significant role in the etiology of dental fear. This finding offers encouraging opportunities for better dental phobia and fear therapies, which could enhance dental treatment utilization and lower rates of this public health issue.

Also, people who suffer from particular phobias, such as odontophobia, could be predisposed to anxiety in general or to particular phobias in particular by inherited genetic sensitivity factors. Dental phobia is not inherited directly, although genetic susceptibility factors may interact with other etiological variables to generate dental phobia<sup>(14,15)</sup>.

2. Psychological status: The psychological status could play an important role in the level of dental anxiety. Hence Tuba Talo Yildirim et al.<sup>(16)</sup> performed a study in 2017, and according to their findings, there is a significant prevalence of psychological disorders among women, young individuals, and those with less education. Furthermore, there is a correlation between psychological problems and dental anxiety as well as dental fear throughout time. These people also exhibit significant levels of dental fear and anxiety. In their study, they assessed depression and anxiety associated with dentistry; going forward, a non-dentistry group would need to be included in their study. Untreated psychological anguish is seen in certain patients.

A significant contributing factor in the genesis of some children's dental anxiety is psychological intrusion, which also affects people as they get older. Embarrassment and humiliation incidents could be especially noticeable. The connections between parental (especially mother) dental

anxiety and general anxiety, child temperament (behavioral inhibition), parenting style, and intrusive parenting are intricate, though. Dentists may unintentionally behave intrusively toward their patients, with unfavorable outcomes<sup>(17)</sup>.

3. Previous traumatic experience: According to the studies, "conditioning via aversive treatment experience" or a traumatic prior dental encounter are the main causes of dental dread and anxiety. A painful dental encounter in childhood can have long-lasting effects that sometimes persist into adulthood<sup>(18-20)</sup>. Also, an implication that a significant contributing factor to dental anxiety and fear may not only be traumatic dental experiences but also other traumatic events. Furthermore, a youngster may develop dental fear and anxiety due to indirect vicarious experiences, such as hearing about or seeing a bad encounter with friends or relatives without realizing it<sup>(18)</sup>.
4. Dentist performance: A dentist, being a neutral stimulus, starts to be linked to unpleasant experiences like pain. Since anxiety is a natural reaction to pain, having a painful dental surgery will be seen as an "unconditional incentive," and dealing with the ensuing fear as an "unconditional answer." Classical conditionality causes the dentist to start to associate with this excruciating event. The dentist thus turns into a "conditional stimulus," which has the potential to induce a fearful conditional reaction. There may be a connection between visiting the dentist and being exposed to any unpleasant stimuli that cause anxiety, such as pain, loss of control, shame, embarrassment, or criticism, if these stimuli are present during patient-dentist interactions<sup>(21)</sup>.

Children may also experience stimulus generation if they start to feel fearful of the new stimuli they have learnt to link with the initial conditional stimulant. For instance, a patient may develop a dread of the dentist in addition to

other things or circumstances that they connect with the dentist, including the smell of a dental office or a dental chair<sup>(18)</sup>.

5. Parents effect: In recent times, there has been a prevalent tendency among parents to accompany their kids during dental procedures in the operatory and to actively support the dentist in the event that behavioral issues arise. The reasons are because parents are curious in what transpired, believe they might be actively involved in helping the dentist when their child has behavioral issues, and believe the child benefited from their presence, which ultimately resulted in a decrease in children's dental fear and anxiety. The impact of parents' presence in the treatment room on their children's dental anxiety is a topic of discussion<sup>(22)</sup>. Research in this field with children of various ages has shown inconsistent findings. When their parent is in the therapy room, the majority of the kids react well. There are times when a parent's presence interferes with the essential dialogue that needs to take place between the youngster and the dentist<sup>(22-24)</sup>.

6. Oral health status: Kuracha Chakradhar et al.<sup>(25)</sup> performed a study in 2020, their goal was to evaluate the relationship between Dental Anxiety and Treatment Needs and Oral Health Status. To determine sample size, evaluate feasibility, and complete a survey for 12-year-old students in a Hyderabad school, a pilot project was carried out. A minimum of 663 pupils and a final sample of 1000 students were included in the study. The survey instrument comprised a Gingival Index, a questionnaire to gauge dental anxiety, and demographic information. Using SPSS, the data was examined, and associations between the Gingival Index, DMFT, and MCDAS scores were found. At  $p < 0.05$ , statistical significance was established. Twelve-year-old youngsters who agreed to undergo oral examinations were included in the study. They discovered that

compared to men, women experienced greater oral anxiety. Similarly, participants who had never seen a dentist before reported feeling more concerned than their peers, and among 12-year-old schoolchildren, there was a relationship between dental anxiety and dentition state and treatment needs.

In 2007, Jason M Armfield et al.<sup>(26)</sup> conducted a study using the 2002 National Dental Telephone Interview Survey (NDTIS) to understand dental fear among Australians. The survey used standardized questions about dental services, treatment outcomes, insurance, and sociodemographic variables. The Dental Anxiety Question (DAQ) was used to assess dental fear and past and future service use. The study also examined the social effects of oral disorders and the causes of routine dental visits. The findings support a theory about the vicious cycle of dental fear, where patients with high dental fear delay treatment, leading to more serious issues and symptomatic visiting patterns.

In a 2018 study conducted by Mohammad A. Alshoraim et al.<sup>(27)</sup>, a sample of 1522 middle school students from Jeddah, Saudi Arabia, was randomly selected. The inclusion criteria required that participants' parents provide informed consent, the children be between 12 and 15 years old, and Arabic be their native language. According to the Ministry of Education, the population frame included all 115,689 students enrolled in Jeddah's public and private middle schools. Two questionnaires were used to assess the research variables. The study spanned from September 2014 to June 2016, involving several school visits. During the initial visit, consent forms and questionnaires were distributed to the selected children. Over the next five months, examiners returned to collect additional data. Only students with parental consent, indicated by signed forms, proceeded to the second phase, where they completed a questionnaire. The findings revealed that dental fear (DF) was low among Arabic-speaking children in Jeddah aged 12 to 15.

Factors associated with DF included age, gender, type of school, irregular dental visits, traumatic dental experiences, and negative behavior during examinations

Research on both pediatric and adult populations investigated the relationship between general anxiety/fear and oral health<sup>(28)</sup>. In children, elevated levels of general anxiety/fear were significantly correlated with a higher incidence of dental caries and a notable decrease in toothbrushing frequency. Among adults, one study identified a significant association between increased general anxiety/fear and poorer Oral Health-Related Quality of Life (OHRQoL). The remaining adult studies produced mixed outcomes with various measures. Specifically, general anxiety/fear was significantly linked to decayed, missing, and filled teeth (DMFT), self-perceived dental problems (but not oral symptoms within the past 12 months), and recurrent (but not overall) caries. One study found no association between general anxiety and caries status<sup>(28-32)</sup>.

### **Risks of children dental and anxiety**

The likelihood of dental disease compromised oral health indicators such as untreated dental infections, and higher-risk treatments is positively correlated with a child's dental fear and anxiety. These factors can have detrimental effects on the quality of life of the individual and their family, as well as lower participation in oral health-related behaviors. Many times, people with severe dental fear and anxiety are unable to receive conventional dental health services<sup>(33-35)</sup>.

İlhan Uzel et al.<sup>(36)</sup> in 2022, performed a study to assess the contributing factors to dental anxiety in kids between the ages of 7 and 12. Their study enrolled 370 children of both genders. Data on parents' socio-economic status, education levels, family income, oral hygiene habits, and the children's caries status were collected through a structured questionnaire. The dental anxiety of both the children and their mothers was assessed using Corah's dental anxiety scale (DAS) and the

Children's Fear Survey Schedule-Dental Subscale (CFSS-DS). They found that there was a positive link between the children's dental caries scores and dental anxiety levels. Another study<sup>(37)</sup> concluded that that child of extremely worried mothers had higher rates of dental caries, indicating a correlation between the mother's dental anxiety and the frequency of dental caries in her offspring.

### **Children fear and anxiety counter measures.**

Dental fear and anxiety are common among children and can significantly impact their oral health and overall well-being. These anxieties often lead to the avoidance of dental visits, resulting in poor oral hygiene and increased dental problems. Addressing dental fear and anxiety in children is essential for promoting positive dental experiences and ensuring long-term oral health. Various strategies, including behavioral techniques, parental involvement, and pharmacological interventions, have been developed to mitigate these issues effectively.

Behavioral techniques are widely used to manage dental fear and anxiety in children. One of the most effective methods is the use of cognitive-behavioral therapy (CBT), which helps children understand and change their negative thoughts and behaviors related to dental visits. According to S. Shahnava et al. in 2016 stated that CBT is a useful treatment for kids and teenagers who experience dental anxiety and ought to be available in pediatric dentistry.<sup>(38)</sup> The "Tell-Show-Do" technique is another common approach, where the dentist explains the procedure (Tell), demonstrates it on a model or finger (Show), and then performs the procedure (Do) on the child. This method helps in familiarizing the child with the dental process and reduces fear of the unknown. A study by Khandelwal et al. in 2018<sup>(39)</sup> found that this technique effectively reduces anxiety and improves the child's behavior during dental visits, since their conclusion emerged that the audiovisual distraction technique was more effective in lowering anxiety than Tell Show Do. Tell Show Do plus audiovisual distraction worked synergistically to lower anxiety levels, and the results were more beneficial.



Cox IC et al.<sup>(40)</sup> performed a study in 2011, to evaluate how a parent's presence in the dental operatory affects their child's behavior while receiving dental care. Their current study's findings indicated that the presence or absence of a parent during therapy did not seem to affect the child's responses. During their second treatment session, only children with low anxiety levels reported noticeably higher discomfort when their parent was not present in the operating room. Highly nervous children tended to report less discomfort throughout their treatment session while their parents were in the waiting area, however this difference was not statistically significant.

According to a study<sup>(41)</sup>, kids exhibit clear anxieties about going to the dentist and have strong preferences about how their dentist and dental offices seem. It is significant to note that although the children in this study did express preferences about the way their dentist looked and how the clinic looked, these preferences might not have much weight in comparison to the dentist's personal qualities like kindness, openness to listening, and clinical competence. It's possible that these characteristics are what actually shape how kids view their dentist. Nonetheless, it is not too difficult to modify one's attire and the clinic's aesthetic to accommodate patients' tastes, and these adjustments have the potential to significantly raise a patient's opinion of the treatment they receive.

Both pharmaceutical and non-pharmacological methods can be used to treat anxiety. The tell show do technique, role modeling, positive reinforcement, hypnosis, and distraction are examples of non-pharmacological behavior control strategies. Pharmacological treatment strategies include conscious sedation or general anesthesia. Most dental treatments can be completed with nonpharmacological behavior modification techniques; however, for children who are extremely anxious, pharmacological management may be required for a successful course of treatment that includes general

anesthesia and various combinations of conscious sedation<sup>(42-44)</sup>.

The most often used inhalation anesthetic in dentistry is nitrous oxide/oxygen (N<sub>2</sub>O), which is categorized as a minimal sedation technique. N<sub>2</sub>O possesses sedative and anxiolytic qualities as well as varied degrees of muscle relaxation and analgesia. Additionally, it is a potent analgesic/anxiolytic that has little effect on the respiratory system and induces euphoria and depression in the central nervous system. This method reduces the need for general anesthesia and is appropriate for children who are compliant but moderately apprehensive<sup>(45)</sup>. N<sub>2</sub>O sedation is a useful choice for treatment under local anesthesia to lessen discomfort, lessen anxiety, and increase parent satisfaction, according to Divya Mukundan et al. in 2023. An atmosphere that is virtually pain- and anxiety-free is possible with this technology<sup>(42)</sup>.

In this field, nursing countermeasures for the treatment of young orthodontic patients may be crucial. In addition to improving the patient's awareness of oral hygiene and cautioning kids about the potential consequences of neglecting oral hygiene, parents should be well-versed in all pertinent oral treatment information and should communicate openly and thoroughly with the doctor prior to orthodontic treatment. In order to provide the patient with stability and positive self-esteem, it is imperative that the patient's psychological condition be actively adjusted. Parents should influence the patient's psychology, lessen verbal stimulation, and provide a laid-back yet energetic therapy environment for their children, in order to remove patients' psychological fear of orthodontic treatment and to increase their courage for orthodontic treatment, parents should explain to their patients the importance and purpose of orthodontic treatment, get their consent beforehand, listen to their concerns patiently, and clear up any confusion<sup>(46,47)</sup>.

The most unstable time for psychological activity is adolescence. Patients are quickly influenced by their surroundings and atmosphere

and are prone to being agitated, rebellious, and engaging in other psychological activities. Active communication is required to assist the patient in removing psychological barriers in response to their psychological panic and other issues. It's important to teach patients how to use their oral organs correctly before beginning orthodontic therapy. Orthodontic therapy often takes a long time. Better patient collaboration will result in a better treatment outcome; poor cooperation will not only cause the treatment to take longer, but it will also have a direct impact on it. To keep patients from experiencing anxiety, it is important to actively stimulate patients' excitement, boost their confidence in the course of therapy, and provide extra support to those who experience anxiety and inferiority complex. In order to ensure that a patient is content and recovers both physically and psychologically, it is important to closely monitor any changes in the patient's health, keep the patient informed about the status of their orthodontic treatment, and make them feel comfortable <sup>(46)</sup>.

## CONCLUSION

In conclusion, treating children's dental fear and anxiety effectively requires an awareness of the psychosocial aspects of pediatric dentistry. A complicated combination of hereditary factors, psychological status, past traumatic events, dentist performance, parental influence, and the child's oral health status influences dental dread, a common problem among young patients. Dental fear has far-reaching consequences since it can cause people to put off getting vital dental care, which can lead to oral health problems. Children's experiences with dentistry can be greatly improved by addressing this fear with a variety of strategies, such as cognitive-behavioral therapy, behavioral techniques like the Tell-Show-Do method, parental participation, and pharmaceutical interventions. Positive dental experiences for kids not only improve their oral health right away, but they also help them develop lifelong dental hygiene practices.

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