Anxiety-Fear-Phobia in Children and its Impact on Adult Dental Fear and Phobia

Çocuklarda Kaygı-Korku-Fobi ve Yetişkinlerde Gözlenen Diş Hekimi Korku ve Fobisine Etkisi

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ABSTRACT Dental anxiety, fear, and phobia constitute a significant clinical and public health concern that often originates in childhood and may persist into adulthood if left unaddressed. Negative dental experiences during early life, inadequate communication, and diminished perceived control can initiate avoidance behaviors, leading to a self-perpetuating cycle of fear and dental neglect. This cycle contributes to the progression of oral diseases, increased need for invasive treatments, and further reinforcement of dental fear. Evidence consistently demonstrates that high levels of dental anxiety are associated with irregular dental attendance, poorer oral health outcomes, reduced oral health–related quality of life, and increased psychological and social distress. Effective management of dental anxiety requires a comprehensive biopsychosocial approach that integrates empathetic communication, behavioral guidance, cognitive behavioral therapy, and pharmacological interventions when necessary. Importantly, early preventive strategies and repeated positive dental experiences during childhood play a protective role by fostering trust and adaptive coping. Addressing dental anxiety from a life-course perspective is essential for improving individual well-being and reducing the long-term burden on oral health systems.

Keywords: Dental anxiety; pediatric dentistry; cognitive behavioral therapy

ÖZET Dental anksiyete, korku ve fobi; çocukluk döneminde başlayan ve müdahale edilmediğinde erişkinlikte kalıcı kaçınma davranışlarına dönüşebilen önemli bir klinik ve halk sağlığı sorunudur. Çocuklukta yaşanan olumsuz dental deneyimler, yetersiz iletişim ve kontrol algısının kaybı, bireylerde diş hekimi randevularından kaçınma eğilimini artırarak "korku-kaçınma döngüsü"nü başlatmaktadır. Bu döngü, ağız ve diş sağlığının bozulmasına, daha invaziv tedavi gereksinimlerine ve dental korkunun pekişmesine yol açmaktadır. Araştırmalar, yüksek dental anksiyete düzeylerinin düzensiz diş hekimi başvurusu, kötü oral sağlık göstergeleri, düşük yaşam kalitesi ve artmış psikososyal sorunlarla ilişkili olduğunu göstermektedir. Dental anksiyetenin etkili yönetimi; empatik iletişim, davranışsal teknikler, bilişsel davranışçı terapi ve gerektiğinde farmakolojik yöntemlerin bütüncül biçimde kullanılmasını gerektirir. Erken yaşta başlatılan koruyucu ve olumlu dental deneyimler, dental anksiyetenin önlenmesinde kritik öneme sahiptir.

Anahtar Kelimeler: Dental anksiyete; çocuk diş hekimliği; bilişsel davranışçı terapi

TRIAD OF DENTAL DISTRESS

The spectrum of dental-related distress is a significant barrier to oral health, ranging from developmentally normative unease to debilitating clinical conditions. While often used interchangeably, dental anxiety, fear, and phobia represent distinct psychological constructs with unique clinical implications.[1,2]

***Dental Fear*:** This is conceptualized as a primary emotional reaction to a specific, identifiable, and immediate threatening stimulus within the dental environment. It is

often a response to past negative encounters that triggers apprehension toward known triggers, such as the sight of a needle or the sound of a drill. Biologically, fear serves as an adaptive "fight or flight" mechanism preparing the individual for perceived danger.[2,3]

***Dental Anxiety*:** This refers to a more generalized, anticipatory state of apprehension regarding what might happen during a future dental visit. It is characterized as a "fear of the unknown," where the patient feels uneasy about potential future threats and often experiences a sense of losing control.[1-3]

***Dental Phobia (Odontophobia)*:** This is the most severe form of dental distress, defined as a marked, persistent, and irrational fear of dental situations. According to DSM-5 criteria, it involves a fear response that is disproportionate to the actual danger and leads to the complete avoidance of dental care, significantly impairing an individual's daily functioning or social life.[1-3]

ETIOLOGICAL PATHWAYS AND CAUSES

The acquisition of dental-related distress is multifactorial, stemming from both internal predispositions and external influences.[3,4]

***Direct Conditioning*:** Considered the most common pathway, this involves a traumatic or painful past dental experience, particularly during childhood. Factors such as perceived helplessness and a lack of control during a procedure intensify this conditioning.[4,5]

***Vicarious and Informative Learning*:** Fear can be acquired indirectly through observing the negative reactions of others (Modeling) or hearing "horror stories" from family and peers. Maternal dental anxiety is a particularly strong predictor of fear in young children. Furthermore, the media's negative portrayal of dentistry can instill biased perceptions in patients.[2,6]

***Endogenous Factors*:** Research suggests a genetic predisposition, with heritability accounting for approximately 30% of the variance in specific phobias. Personality traits such as neuroticism, high stress reactivity, and general anxiety vulnerability also play a role in how individuals process dental stimuli.[2]

***Adverse Childhood Experiences (ACEs)*:** Non-dental trauma, such as physical or sexual abuse, can generalize into the dental setting, where the physical proximity and invasive nature of procedures trigger past traumatic memories.[7]

DIFFERENTIAL DIAGNOSIS: KEY DISTINCTIONS

Identifying the nuances between these states is critical for tailoring management strategies. Fear is a reaction to a real, immediate stimulus, whereas anxiety is anticipatory and focusless, occurring before the patient even enters the clinic.[6] Mild fear and anxiety can be normative developmental experiences that children eventually outgrow. However, phobia is a diagnosable anxiety disorder characterized by a breakdown in the ability to accept necessary care.[8,9] A hallmark of dental phobia is the avoidance-deterioration cycle. Patients avoid the dentist due to fear, leading to worsening oral conditions. When pain eventually forces a visit, the required treatment is often more invasive and painful, which reinforces the original fear and perpetuates future avoidance.[7,10] While simple behavioural guidance (e.g., "Tell-Show-Do") may suffice for mild anxiety, phobic patients often require specialized psychological interventions, such as exposure-based Cognitive Behavioural Therapy (CBT), to break the cycle of avoidance.[9,11]

IMPACT OF CHILDHOOD DENTAL ANXIETY ON ADULT ODONTOPHOBIA

Dental-related distress in children is not merely a transient developmental phase; for many, it serves as the foundational stage for chronic adult dental phobia. While normative fears often diminish with cognitive maturation, a significant subset, approximately 15% of paediatric patients, experience persistent anxiety that translates into debilitating avoidance behaviours in later life. Understanding this transition requires an analysis of the "vicious cycle of fear," specific etiological pathways, and the moderating role of early clinical encounters.[5,9]

The literature establishes that the onset of dental anxiety typically occurs in childhood, peaks in early adulthood, and often becomes chronic if not intercepted. The transition from childhood distress to adult phobia is frequently characterized by the vicious cycle of dental fear.[3,8,12] Early traumatic experiences lead to the avoidance of routine care. This avoidance results in deteriorated oral health (increased caries and periodontal issues), necessitating invasive "emergency" treatments (e.g., extractions or root canals).[13] These invasive procedures, often performed under physiological stress, serve as a negative reinforcement that confirms the individual's phobic expectations, thereby solidifying the phobic response in adulthood.[14]

The acquisition of adult phobia from childhood roots generally follows three primary psychological pathways:

Direct Conditioning (The Pain Factor): Traumatic or painful dental procedures in early childhood especially extractions are the most potent predictors of adult phobia. Subjective experiences of helplessness and lack of control during these procedures are often more predictive of future phobia than the objective number of cavities treated.[7]

Latent Inhibition: This serves as a protective mechanism. Children who have a history of multiple positive, non-invasive check-ups (onboarding) before experiencing a painful event are "vaccinated" against developing long-term phobia.[4,8]

***Vicarious and Informative Learning*:** Indirect learning occurs when children observe maternal dental anxiety or hear "horror stories" from peers. Careless remarks by parents (e.g., using the dentist as a threat for bad behaviour) can fundamentally alter a child's perception of dental care, fostering an informational pathway to adult phobia.[7]

Non-dental trauma, such as physical or sexual abuse, can generalize into the dental setting. The physical proximity and vulnerability inherent in dental procedures can trigger past traumatic memories (trauma coupling), leading to intense adult odontophobia.[7,15]

Beyond direct trauma, the internal model of the self and parenting styles play critical roles. Parenting characterized by overcontrol, guilt induction, and invalidation of a child's feelings ("It doesn't hurt") impairs the development of self-efficacy. Such children often enter adulthood lacking the resilience to handle medical stressors, viewing the dental environment as an assault on the self.

Children with an "inhibited" temperament are genetically predisposed to respond with fear to novelty. If these children experience early dental trauma, their anxiety is significantly more likely to stabilize into a permanent phobic trait compared to uninhibited peers.[13]

According to a birth cohort study for over 50 years, early-onset dental fear is strongly associated with childhood conditioning and high caries levels.[16] It noted that the prevalence of anxiety rose from 10.6% at age 15 to 21.1% at age 26, suggesting that the transition to young adulthood is a critical window where childhood fears either remit or escalate into clinical phobias.[16] Clow, et al. reported that irregular dental attendance at age 8 was a massive predictor of anxiety at age 17. Irregular attenders had 3.67 times the odds of reporting dental anxiety in late adolescence compared to regular attenders.[10] According analysing 497 recruits (ages 18-19), researchers found that those treated sporadically during childhood had a significantly higher prevalence of high dental anxiety (23.4%) compared to those who received regular care (15.4%). This underscores that a long-term relationship with a regular dentist in childhood is more effective than the professional specialty of the clinician in preventing adult phobia.[3] In another study of 5,882 adolescents, a dose-response relationship was found between the number of adverse childhood experiences (ACEs) and dental fear. Individuals reporting any ACE were 74% more likely to have dental fear, with the effect being most pronounced in females.[15]

Anxiety and fear that develop during childhood can lead not only to behavioral problems in childhood but also to dental phobia and avoidance behaviors in adulthood. The most prominent clinical consequence of dental anxiety is avoidance of dental appointments and impaired treatment adherence.[17]

In recent years, it has been emphasized that dental anxiety is not merely an individual problem but an important public health issue that affects access to oral and dental health services, treatment costs, and population-level oral health indicators.[18-20] With the COVID-19 pandemic, reductions in dental visits, fear of infection, and economic uncertainties have made dental anxiety and avoidance behaviors even more apparent.[21,22]

Community-based studies indicate that the prevalence of dental anxiety in the adult population ranges between 10-20%, while approximately 5% of individuals experience severe dental fear.[6,23,24] Higher levels of dental anxiety have been reported in women compared to men; greater anxiety has been observed in young adults compared to older age groups; and the association between dental anxiety and irregular dental attendance has been shown to be stronger among individuals with lower income and educational levels.[17,18]

THE IMPACT OF DENTAL ANXIETY ON TREATMENT ADHERENCE IN ADULTS

The most prominent clinical outcome of dental anxiety is avoidance of dental appointments and impaired treatment adherence. Armfield et al. demonstrated that adults with high dental fear tend to visit the dentist primarily when pain or an emergency occurs, and that their attendance rates for routine check-ups and professional cleanings are significantly lower.[17] This situation fuels a vicious cycle described in the literature as the "vicious cycle" of dental fear. In this cycle:

- The individual avoids routine check-ups due to fear.
- Caries and periodontal problems progress.
- More invasive, longer, and potentially more uncomfortable treatments become necessary.
- These negative experiences further reinforce fear.
- Avoidance and postponement behaviors intensify.[17,18]

Vermaire et al. reported that individuals with high dental anxiety are 2-3 times more likely to avoid dental visits and cancel appointments compared to those with low anxiety.[25] In this group, non-adherent behaviors such as frequently questioning the dentist's recommendations, refusing anesthesia or specific procedures, and discontinuing treatment prematurely are also more common.[6]

In children and adolescents, dental anxiety complicates cooperation during treatment and leads to delays in preventive care. Taani et al. showed that children with high dental fear more frequently exhibit behaviors such as crying, leaving the dental chair, and refusing to open their mouths during appointments, which prolongs treatment time and creates tension in the dentist–patient relationship.[26] Shim, et al. reported lower completion rates of prophylactic and restorative procedures among children with high dental anxiety.[27] Consequently, these individuals are more likely to face more invasive procedures later in life, leading to further deterioration of their oral health status.

EFFECTS OF DENTAL ANXIETY ON ORAL HEALTH IN ADULTS

Dental anxiety negatively affects oral and dental health both indirectly (through avoidance, irregular attendance, and premature discontinuation of treatment) and directly through psychosocial mechanisms (such as neglect of self-care and reduced motivation). Recent studies have demonstrated consistent associations between high levels of dental anxiety and poorer oral health indicators.[28-30] Gisler, et al., in a cross-sectional analysis conducted among adults in Switzerland, found that individuals with high dental anxiety had higher DMFT indices, more advanced periodontal attachment loss, a greater number of extracted teeth, and increased need for prosthetic and restorative treatments.[28] Similarly, Schuller et al. reported that adults with high dental fear in the Norwegian population exhibited poorer clinical periodontal status and greater tooth loss compared to those with lower anxiety levels.[29] Crego, et al. showed that in young adults, dental anxiety was associated not only with past caries and restoration history but also with the frequency of acute pain episodes in the previous year, emphasizing a pronounced tendency to seek dental care "only when pain occurs."[30]

Moreover, individuals with high dental anxiety may show reduced motivation or postponement in self-performed oral care behaviors, such as the use of dental floss, interdental brushes, and seeking professional cleanings. Thomson et al. demonstrated that participants with high dental fear underwent professional prophylaxis less frequently and exhibited more irregular oral hygiene behaviors compared to regular dental attenders.[18]

As a result of long-term avoidance, functional impairments (such as chewing difficulties, hypersensitivity, and speech problems) and aesthetic issues (including anterior tooth loss, discoloration, and malposition) may develop, leading to significant declines in oral health-related quality of life.[25,30]

PSYCHOLOGICAL AND SOCIAL CONSEQUENCES OF DENTAL ANXIETY IN ADULTS

Dental anxiety is a multidimensional condition that affects not only oral and dental health but also overall psychological well-being and social functioning. Individuals with high dental fear exhibit higher levels of general anxiety and depressive symptoms, reduced self-esteem and negatively affected body image-particularly due to aesthetic problems, and increased social avoidance, feelings of shame, and perceived stigma.[6,18,25,28,31]

Halitosis, visible caries, anterior tooth loss, or aesthetically displeasing restorations may cause individuals to avoid smiling, refrain from being photographed, feel anxious during close interpersonal interactions, and withdraw from social environments. Crego, et al. showed that young adults with high dental anxiety were more likely than their low-anxiety peers to agree with statements such as "I am ashamed of my mouth" and "I hide my smile."[30]

Prolonged avoidance and neglect may also increase feelings of guilt, regret, and self-blame. Humphris et al. reported that a substantial proportion of patients with high dental anxiety frequently expressed self-critical cognitions, which may further delay help-seeking behaviors and reinforce the cycle of fear and avoidance.[23]

These psychological and social consequences may also affect occupational and educational functioning. Individuals working in professions requiring intensive face-to-

face communication may experience decreased performance, avoidance of public speaking, and rejection of career opportunities due to concerns about their teeth and smile.[18,25]

MANAGEMENT OF DENTAL ANXIETY IN ADULTS

The clinical management of dental anxiety should not be limited to short-term sedation or anesthesia; rather, it should incorporate biopsychosocial, patient-centered, and evidence-based approaches. In recent years, the combined use of effective communication, behavioral techniques, cognitive behavioral therapy (CBT), virtual reality applications in some cases, and pharmacological methods when necessary has been recommended.[32-34]

EFFECTIVE COMMUNICATION

A trust-based, empathetic, and open communication style is fundamental to reducing dental anxiety. Recommended strategies include listening to patients' fears in a nonjudgmental manner, normalizing dental anxiety as a common and understandable condition, explaining procedures step by step using clear and simple language, providing patients with a "control signal," and preferring minimally invasive interventions during initial visits.[33]

In children, involving parents appropriately in the process is essential for creating a safe treatment environment. Porritt et al. reported that calm, supportive, and modeling parental behavior can significantly reduce children's dental anxiety.[35]

BEHAVIORAL TECHNIQUES AND CBT

In adults, cognitive behavioral therapy (CBT) is considered one of the most effective psychological interventions for managing dental anxiety. CBT focuses on identifying and restructuring maladaptive thoughts related to dental treatment, thereby reducing fear and avoidance behaviors.[36] Exposure-based techniques are also effective in reducing dental fear, while clear, empathetic, and patient-centered communication between the dentist and the patient plays a critical role in alleviating anxiety and improving treatment compliance.[37]

Aktar et al. reported that CBT has a moderate-to-high effect size in reducing dental anxiety levels and that the gains achieved are largely maintained at follow-up assessments.[32] Recently, the applicability of online and modular CBT programs for dental anxiety has been explored, with preliminary findings suggesting that these approaches are particularly promising for patients with limited access to care.[38]

PHARMACOLOGICAL APPROACHES AND SEDATION

Pharmacological methods are considered in cases of severe dental phobia, complex surgical treatment requirements, or when adequate cooperation cannot be achieved through behavioral or psychological techniques. Current approaches recommend combining pharmacological methods with psychological interventions whenever possible, as the use of sedation alone does not modify the underlying fear and avoidance mechanisms and may limit long-term improvement.[34]

MULTIDISCIPLINARY APPROACHES

In patients with high dental anxiety and comorbid psychiatric conditions, collaboration between dentists and psychiatrists or clinical psychologists is essential. Humphris et al. reported that patients participating in a multidisciplinary dental anxiety management program showed significant and sustained reductions in both Modified Dental Anxiety Scale (MDAS) scores and general anxiety and depression levels.[23]

PREVENTIVE AND COMMUNITY-BASED APPROACHES

Introducing children to regular, brief, and painless dental visits during the preschool and early school years is a fundamental strategy for preventing dental anxiety. Taani et al. and Shim et al. demonstrated that early preventive programs not only reduce caries incidence but also contribute to the development of positive associations with dental care.[26,27]

Improving public knowledge and health literacy regarding oral and dental health may help reduce misinformation and exaggerated threat perceptions underlying dental anxiety. Disseminating messages that modern local anesthesia effectively controls pain, that most treatments can be performed using minimally invasive methods with early attendance, and that regular check-ups prevent the need for more extensive interventions is of great importance.[18,29]

Including more content on behavioral sciences, communication skills, and dental anxiety management in dental school curricula can enable newly graduated dentists to manage anxious patients more effectively. McNeil and Randall reported that students receiving training focused on behavior management and communication experienced lower levels of professional stress when working with highly anxious patients.[34] Simulations, role-playing, and observation-based training further support empathetic and patient-centered approaches.[23]

Expanding public health-oriented oral and dental care services and increasing access to preventive and therapeutic interventions may indirectly alleviate dental anxiety by reducing cost and accessibility concerns.[18]

CONCLUSION

Dental anxiety, fear, and phobia represent a developmental continuum that often originates in childhood and, if left unaddressed, may consolidate into persistent odontophobia in adulthood. Dental experiences play a decisive role in shaping long-term dental attitudes, treatment-seeking behaviors, and oral health outcomes.Adults with high dental anxiety experience not only poorer oral health but also reduced quality of life, increased shame and social withdrawal, and impaired occupational functioning. At the population level, dental anxiety contributes to inequities in access to care, higher treatment costs, and increased burden on emergency dental services. These findings underscore the necessity of recognizing dental anxiety as a significant public health concern rather than solely an individual psychological issue. Effective management of dental anxiety requires a comprehensive biopsychosocial approach. Empathetic communication, behavioral guidance, and cognitive behavioral therapy -particularly when introduced early- are central to breaking the cycle of fear and avoidance.

Preventing the intergenerational transmission of dental anxiety depends on prioritizing positive dental experiences in childhood, strengthening communication and behavioral training in dental education, and integrating psychological principles into routine dental practice. Early intervention, continuity of care, and community-based preventive strategies offer a powerful opportunity to reduce the long-term burden of dental anxiety and promote equitable, sustainable oral health across the lifespan.

REFERENCES

1. Peric R, Tadin A. Associations between Dental Anxiety Levels, Self-Reported Oral Health, Previous Unpleasant Dental Experiences, and Behavioural Reactions in Dental Settings: An Adult E-Survey. Medicina. 2024;60:1303.
2. Alsayyalı MA, Alkhatlan NS, Alsahlı HM, Alsayegh NS, Alghanım AR, Alokaily AM, et al. Explorıng Dental Fear And Phobıa: Causes, Dıagnosıs, And Impact On Health And Socıety. TPM. 2025;32(S1):1518-25.
3. Levin L, Eli I, Ashkenazi M. Dental anxiety among young Israeli male adults as related to treatment received during childhood. J Public Health Dent. 2006;66(2):147-51.
4. Piechal A, Siekierska E, Blecharz-Klin K. Etiology of Dental Anxiety and Dental Phobia: Review. Eur J Dent. 2026;20(1):13-22.
5. American Academy of Pediatric Dentistry. Behavior guidance for the pediatric dental patient. The Reference Manual of Pediatric Dentistry. Chicago, IL: American Academy of Pediatric Dentistry. 2025. p. 379-99.
6. Carter AE, Carter G, Boschen M, AlShwaimi E, George R. Pathways of fear and anxiety in dentistry: A review. World J Clin Cases. 2014;2(11):642-53.
7. Beaton L, Freeman R, Humphris G. Why are people afraid of the dentist? Observations and explanations. Med Princ Pract. 2014;23(4):295-301.
8. Maicel E. Sims. A Meta-Analysis of the Correlation Between Dental Anxiety and Oral Health Effect on Adults. Oklahoma State University Honors Thesis Dr. Karen Hickman Spring 2024.
9. Schibbye R. Specific Phobia in Dentistry: Origin, Prevalence, And Treatment For Children And Adolescents [Doctoral thesis]. Stockholm, Sweden: Karolinska Institutet; 2025.
10. Clow J, Northstone K, Hardwick C, Dermont M, Dudding T. Are childhood oral health behaviours and experiences associated with dental anxiety in adolescence? Int J Paediatr Dent. 2023;33(4):372-81.
11. Almarzouq SSFS, Chua H, Yiu CKY, Lam PPY. Effectiveness of Nonpharmacological Behavioural Interventions in Managing Dental Fear and Anxiety among Children: A Systematic Review and Meta-Analysis. Healthcare (Basel). 2024;12(5):537.
12. Sun IG, Chu CH, Lo ECM, Duangthip D. Global prevalence of early childhood dental fear and anxiety: A systematic review and meta-analysis. J Dent. 2024;142:104841.
13. Chapman HR, Kirby-Turner N. Psychological Intrusion - An Overlooked Aspect of Dental Fear. Front Psychol. 2018;9:501.
14. Panda S, Quadri MFA, Hadi IH, Jably RM, Hamzi AM, Jafer MA. Does Dental Fear in Children Predict Untreated Dental Caries? An Analytical Cross-Sectional Study. Children (Basel). 2021;8(5):382.
15. Myran L, Sun YQ, Dahllöf G, et al. Associations of adverse childhood experiences with dental fear, and the mediating role of dental fear on caries experience: the Young-HUNT4 Survey. BMC Oral Health. 2025;25(1):1141.
16. Poulton R, Moffitt TE, Silva PA. The Dunedin Multidisciplinary Health and Development Study: overview of the first 40 years, with an eye to the future. Soc Psychiatry Psychiatr Epidemiol. 2015;50(5):679-93.
17. Armfield JM, Stewart JF, Spencer AJ. The vicious cycle of dental fear: Exploring the interplay between oral health, service utilization and dental fear. BMC Oral Health. 2010;10:1.
18. Thomson WM, Poulton R, Kruger E, Davies S, Brown RH, Silva PA. Socioeconomic and behavioral factors associated with dental anxiety in adults. Community Dent Oral Epidemiol. 2010;38(2):113-20.
19. Hill KB, Chadwick B, Freeman R, O'Sullivan I, Murray JJ. Adult Dental Health Survey 2009: Relationships between dental attendance patterns, oral health behaviour and the current barriers to dental care. Br Dent J. 2013;214(1):25-32.
20. Tiwari T, Armfield JM, Slade GD, Spencer AJ. Dental fear and its implications for public health. J Public Health Dent. 2021;81(1):1-9.

21. Pasini M, Brignardello E, Borraccino A, Lentino C, Cuffari B. COVID-19 and dental fear and anxiety: Short-term impact on dental attendance. Minerva Stomatol. 2020;69(4):204-12.

22. Ahmed MA, Jouhar R, Ahmed N, Adnan S, Aftab M, Zafar MS, et al. Fear and practice modifications among dentists to combat novel coronavirus disease (COVID-19) outbreak. Int J Environ Res Public Health. 2020;17(8):2821.

23. Humphris G, Crawford JR, Hill K, Gilbert A, Freeman R. UK population norms for the Modified Dental Anxiety Scale (MDAS) with percentile calculator: Adult Dental Health Survey 2009 results. BMC Oral Health. 2013;13:29.

24. Leutgeb V, Übel S, Schienle A. Brain volume alterations in dental phobia. J Psychiatr Res. 2012;46(4):581-4.

25. Vermaire JH, de Jongh A, Aartman IH. Dental anxiety and quality of life: The effect of dental treatment. Community Dent Oral Epidemiol. 2012;40(5):409-16.

26. Taani DQ, El-Qaderi SS, Abu Alhaija ES. Dental anxiety in children and its relationship to dental attendance and behavior. Int J Paediatr Dent. 2014;24(2): 123-31.

27. Shim YS, Kim AH, Jeon EY, An SY. Dental fear & anxiety and dental behavior in children. J Dent Child. 2015;82(2):90-6.

28. Gisler V, Bassetti R, Mericske-Stern R, Bayer S, Enkling N. A cross-sectional analysis of the prevalence of dental anxiety and its relation to oral health in a Swiss adult population. Clin Oral Investig. 2012;16(3):735-41.

29. Schuller AA, Willumsen T, Holst D. Are there differences in oral health and oral health behavior between individuals with high and low dental fear? Community Dent Oral Epidemiol. 2011;31(2):116-21.

30. Crego A, Carrillo-Díaz M, Armfield JM, Romero-Maroto M. From public mental health to community oral health: The impact of dental anxiety and fear on dental status. Int J Environ Res Public Health. 2021;18(4):1717.

31. Locker D, Poulton R, Thomson WM. Psychological disorders and dental anxiety in a young adult population. Community Dent Oral Epidemiol. 2011;39(4):318-25.

32. Aktar T, Shaikh MA, Khalid M. Efficacy of cognitive behavioral therapy for patients with dental anxiety: A systematic review. Pak Oral Dent J. 2017;37(3): 470-6.

33. Appukuttan D. Strategies to manage patients with dental anxiety and dental phobia: Literature review. Clin Cosmet Investig Dent. 2016;8:35-50.

34. McNeil DW, Randall CL. Dental fear and anxiety associated with oral health4care: Conceptual and clinical issues. In: Mostofsky DI, ed. Behavioral Dentistry. 2nd ed. Ames, IA: Wiley-Blackwell; 2014. p.165-92.

35. Porritt J, Marshman Z, Rodd HD. Understanding children's dental anxiety and psychological approaches to its reduction. Int J Paediatr Dent. 2012;22(6):397-405.

36. Wide Boman U, Carlsson V, Westin M, Hakeberg M. Psychological treatment of dental anxiety among adults: A systematic review. Eur J Oral Sci. 2013;121(3 Pt 2):225-34.

37. Newton JT, Asimakopoulou K, Daly B, Scambler S, Scott S. The management of dental anxiety: Time for a sense of proportion? Br Dent J. 2012;213(6):271-4.

38. Syrjälä AM, Tolvanen M, Knuuttila M, Suominen AL. Online cognitive behavioral therapy for dental anxiety: A randomized controlled trial. J Anxiety Disord. 2021;79:102386.