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Dental anxiety – conditions, models and therapy


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ABSTRACT

Dental anxiety is a condition suffered by many dental patients. It causes psychological discomfort and avoidance of dental appointments, which in turn may lead to oral health issues. Dental anxiety has not yet been fully explored and seems to be still posing challenge to both dentists and psychologists. The aim of this article is to review dental anxiety studies, paying particular attention to the conditions, social, demographic and psychological correlations, as well as the ramifications of this type of anxiety. The article presents the most common psychological models of dental anxiety, methods to measure this type of anxiety and therapy techniques used with patients suffering from dental anxiety.

Keywords: dental anxiety, discomfort, therapy.

Introduction

Dental anxiety is considered a global challenge in the area of dental care [1, 2]. It is said to be a serious, common form of medical stress. Dental anxiety is defined as patient's reaction to a specific kind of dental-related stress [1, 3], and according to McNeil and Berryman [4], it is an emotional reaction to dental stimuli or experiences combined with a cognitive evaluation of such stimuli and experiences. Dental anxiety is a complex phenomenon, which has a somatic, psychological and social dimension, which is why psychology may be of particular use to dentistry [5] in the process of studying dental anxiety.

Due to the fact that dental anxiety is so common a condition, many believe it should be a central focus for dentists [6]. It is estimated that strong dental anxiety is suffered by approximately 20% of patients [7, 8] and anxiety before dental appointments experienced by about 40% of patients [9, 10]. Kelly et al. [11] cite survey results

which show that 64% of respondents experience uneasiness provoked by dental appointments, and 49% feel afraid before going to the dentist.

Analysing dental anxiety brings both theoretical and practical benefits, partly due to the fact that this type of anxiety is a common problem and partly because it has serious negative consequences. Research show that dental anxiety leads to dental care avoidance [12], negligence of oral health [13] and lower overall quality of life [5, 12, 14, 15]. Dental anxiety is also related to pain which impels people to seek dental help only after they start to feel it [16]. It might be said that dental anxiety bears somatic consequences, i.e. deterioration in the health of the oral cavity and the entire body, psychological consequences, i.e. lower self-esteem related to external appearance, and social consequences consisting in the deterioration in the quality of social relations and withdrawal from interpersonal relations.

This article aims to carry out a psychological analysis of dental anxiety based on the studies conducted to date. In the first part, the paper presents the conditions provoking dental anxiety, together with its social, demographic and psychological correlations. Further on, the article describes the most common models of dental anxiety and the best-known psychological methods of this anxiety measurement. The final part concentrates on the illustration of selected therapeutic techniques used in the treatment of this type of anxiety.

Conditions provoking dental anxiety

Weiner and Sheehan [17] suggest that dental anxiety may be exogenous or endogenous. The exogenous type of dental anxiety is conditioned by a negative dental experience, whereas the endogenous anxiety accounts for the vulnerability to react with fear to potentially dangerous situations. The most frequent cause of dental anxiety is past, usually childhood, traumatic experiences related to dental care [4, 17, 18]. In the studies carried out by De Jongh, Aartman, Brand [19], 87% of patients with a dental phobia reported an extremely aversive past dental appointment. From among the above group, 46% of patients displayed one or more symptoms of the post-traumatic stress disorder (PTSD). However, study results also show that many of those with a dental phobia did not experience an aversive dental treatment in the past. Analogically, among the patients who experienced a negative dental experience, there are people who do not suffer from a dental phobia [20].

It is found that some people may have learnt dental anxiety from a member of their family who was dentally anxious [21]. Thomson, Locker, Poulton [22] state that psychological factors contribute to the aetiology of dental anxiety more substantially than aversive dental experiences. Vulnerability to feel dental anxiety is related to certain predisposing personality characteristics, mainly a general susceptibility to anxiety [18]. Fearful people exaggerate the intensity of aversive incidents and dental anxiety may be very deeply rooted and related to other problems of psychological nature. These could be for example the fear of losing control, crossing borders of intimacy, etc.

Correlators of dental anxiety

Results of the studies carried out by Hagglin et al. [23] indicate that the level of dental anxiety decreases with age; elder people experience less dental anxiety than younger people. Results of other studies, however, suggest a different correlation. Hittner and Hemo [24] proved that dental anxiety correlates significantly and positively with age. In dental anxiety questionnaires, women obtain higher results than men. Furthermore, results show a significant negative correlation between the amount of income and dental anxiety [24].

Abundant research has been conducted concerning psychological correlators of dental anxiety. Research proves that dental anxiety correlates significantly and positively with neuroticism [18, 23]. Economou [26] proved a significant positive correlation between dental anxiety and self-awareness, understood as seeing yourself as an object observed by other people. De Jongh [27] showed a significant correlation between dental anxiety and forcing out thoughts about dental appointments and the frequency of negative intrusive thoughts about dental treatment. In an interesting experiment conducted by Muris et al [28], both the subjects who did not experience deep dental anxiety and the ones who experienced a dental anxiety were asked to suppress negative thoughts associated with dental appointments. As a result, the persons who did not have a deep dental anxiety began to experience acute anxiety before dental care, and patients with a dental anxiety did not note a higher level of fear. Authors of this experiment explain the paradox, stating that in order to suppress feelings in the experiment – as requested – patients with a anxiety applied certain remedial reactions they had previously worked out, whereas the ones who did not suffer from a dental anxiety had not developed and could not use any techniques to deal with the dental-related contents provoking fear. Such an interpretation might raise doubts, though. If the patients suffering from a dental anxiety had worked out certain techniques for dealing with fear, they would not have been suffering from dental anxiety; the fact that they were not feeling increased dental anxiety may have stemmed from the fact that their thoughts, paradoxically updated by the experimental instruction to suppress, were *de facto* always present in their minds (hence the

anxiety) and the instruction itself did not activate such thoughts, which could in turn occur in the case of the patients with weak dental anxiety.

In the studies published by Hittner and Hemo [24], significant positive correlations were proved between dental anxiety and life satisfaction, forcing out negative thoughts about dental treatments and the internal locus of control. In the said studies, the more satisfied the subjects were with life, the more often they forced out negative thoughts about dental care and the more internal locus of control they felt, the deeper fear they experienced. One of the explanations to the above correlations offered by Hittner and Hemo [24] was that w people fear that their life satisfaction may deteriorate because of dental issues. A person may, for instance, fear that poorer oral health will hinder their ability to derive pleasure out of life. Anticipating the events which may deteriorate your quality of life may increase the level of dental anxiety. When it comes to a rather intriguing correlation between placing control internally and dental anxiety, Hittner and Hemo [24] explain that fear may be related to feeling responsible for one's own conduct, including for one's own oral health care. Such responsibility is adopted by people with internal control who assume responsibility for aversive experiences from the past, as well as the ones which will happen in the future. When summarising the results of their studies, Hitner and Hemo [24] emphasized that dental anxiety may be also positively stimulating, as it may motivate to exercise care of oral health.

Crofts-Barnes et al [16] studied the correlation between the preoperative anxiety associated with dental procedures and the interferences caused in the daily life of the people with a strong dental anxiety. Dental anxiety correlated significantly and negatively with the quality of life. In the studies conducted by Tellez et al. [8], dental anxiety correlated significantly and positively with the pain experienced during the last dental appointment and the fear of revealing one's own looks. Similarly, results of the studies carried out by Hoogstraten [18], Cohen et al. [28], and Kent [29] report a significant positive correlation between dental anxiety and the state of fear and pain related to dental procedures.

Kyle et al. [30] showed that dental patients remember stronger pain, i.e. stronger than than the one actually experienced, and this correlation

is stronger in the case of patients with a more severe dental anxiety [31, 32]. Study results published by van Wijk and Hoogstraten [18] show that people have a tendency to experience exaggerated fear of dental pain if they have not felt this type of pain personally. People generally expect stronger pain than the one they will be actually experiencing. The said dependency is stronger in persons with more dental anxiety [18, 33].

Moreover, study results show significant positive correlations between dental anxiety and anxiety disorders, such as Generalized Anxiety Disorder (GAD), agoraphobia, fear of injections and blood, and Social Anxiety Disorder (SAD) [17, 34, 35]. In the studies conducted by McNeil and Berryman [4], dental anxiety co-existed with the fear of pain, fear of closed spaces and of being hurt.

Models of dental anxiety

Professional literature defines several types of dental anxiety models: the ones based on the theory of learning, the ones based on cognitive theories, the ones associated with the concept of social functioning and the systemic and functional ones. Among the most popular dental anxiety and fear models, there are models understood as a variable conditioned by an aversive dental experience [8, 20]. These models assume that a negative, often painful dental experience is a decisive factor in the development of dental anxiety. As a result of a negative dental experience, the patient associates dental appointment stimuli, such as the sound of drilling, smell of disinfectants, etc. with discomfort and pain. An example here is the model of three pathways proposed by Rachaman [36]. Rachaman [36] assumes that people acquire pain before dental appointments, because they have either experienced an aversive dental appointment themselves, witnessed someone else experience an aversive dental appointment or heard of an incident of an unpleasant dental appointment.

An example of the Cognitive Vulnerability Model is the model proposed by Armfield [6, 20]. The model is primarily based on a cognitive evaluation of the situation. According to Armfield [6, 20], a person's perceptions of a dental experience are crucial in the development of fear, i.e. the perceptions of an uncontrollable, unpredictable

le, dangerous and disgusting experience. How a dental experience is perceived stems from the combination of personal qualities and life experiences.

The cognitive nature of dental anxiety is stressed out by other researchers, too. Litt [37] for example, points out that the phenomenon of dental anxiety is a perfect illustration of a certain regularity, namely that characterisation of and experiences associated with a specific situation matter more in the evaluation of how aversive a situation is than the situation's objective properties.

The model of anxiety proposed by Berggren [5] is an example of a social model. This is a model of a vicious circle. It presents correlations between dental anxiety, avoidance of dental care, deterioration of dentition and feelings of guilt, shame and inferiority. In this model, it is of significance that people are social beings, and interpersonal relations constitute a very important aspect of human life. In interpersonal relations, external appearance plays a significant role which is why oral health issues so strongly and negatively influence the quality of social functioning.

Dental anxiety may be also interpreted in terms of systemic and functional models, such as by the Function-Action Model of Psychological Defense proposed by Senejko [38]. From the perspective of this model, dental anxiety may be treated as an indicator of blocking (hindering or preventing) the realization of the most important needs, constituting the basis of the human motivational system. One may assume that dental anxiety is a sign indicating that the satisfaction of basic needs has been disturbed, i.e. of the need for safety, control, identity, emotional contact, etc. From this perspective, it is the specificity of the blocked standards of regulation and their degree of importance for the subject which have a decisive impact on both how a dental appointment is treated in terms of danger and/or challenge, and what the subjective feeling of dental anxiety is, as well as how to deal with it.

What are dental patients afraid of?

Based on their clinical trial, Milgrom et al. [39] proposed a classification system (known as the Seattle system), reflecting the main categories of dental anxiety. In the system, four diagnostic

types are proposed: 1. fear of specific dental stimulus; 2. anxiety about somatic reactions during treatment; 3. generalized anxiety or multiphobic symptoms; 4. distrust of dental personnel [34].

In the research conducted by Armfield [20], dental anxiety significantly and positively correlated with the following aversive dental experiences: feeling of being gagged, fainting and personal issues with the dentist. Of note, most of the subjects who claimed to have experienced strong pain during a past dental appointment reported a low or moderate degree of dental anxiety.

Measuring the degree of dental anxiety

To measure dental anxiety, physiological, behavioural and psychological methods are used [40]. Physiological methods assess physiological reactions of the body, such as the pulse, heart rate, blood pressure, tension of the muscles. Another technique used is measuring the Cortisol level in saliva [40, 41]. In the case of behavioural methods, a dentist evaluates patient's behaviour. The evaluation is carried out on an appropriate numerical scale.

In the psychological evaluation of the level of dental anxiety psychological questionnaires are used. The questionnaires mainly involve self-assessment, which means that the patient subjectively evaluates the level of experienced dental anxiety. **Table 1** presents the most popular psychological methods used to evaluate dental anxiety.

Kaczmarek et al. [40] point out that on a daily basis, dentists extremely rarely use scales to measure dental anxiety [see 50]. Some dentists believe that the use of such questionnaires before a dental procedure can worsen the relationship between the patient and the dentist, because the patient concentrates on unpleasant events. Study findings, however, contradict such a dependence. The study carried out by Kent [29] shows that the measurement of fear and pain before a dental procedure did not affect the level of anxiety and discomfort of patients after the procedure. What is more, this type of measurement can have a beneficial influence on the general condition of the patient. Research results by Carlsen et al. [51] showed that the measurement of fear and pain in children before the dental procedure related to a decrease in the level of anxiety associated with

Table 1. Short characteristics of popular psychological methods used to evaluate dental anxiety

Questionnaire	Author(s)	Number of items	What does it measure?
Corah's Dental Anxiety Scale (CDAS)	Corah [42]	4	General dental anxiety
Modified Dental Anxiety Scale (MDAS)	Humphris, Morrison, Lindsay [43]	5	Anxiety about dental treatment with an additional question concerning anxiety about local anaesthesia
Gatchel's 10-Point Dental Fear Scale	Gatchel [44]	1	General dental anxiety
Dental Hygiene Fears Survey (DHFS)	Gadbury-Amyot and Williams [45]	16	Anxiety associated with dental and hygienic procedures
Fear of Dental Pain Questionnaire (FDPQ)	van Wijk and Hoogstraten [18]	18	Fear for dental pain
Dental Anxiety Inventory (DAI)	Stouthard and Hoogstraten [46]	36	General dental anxiety
Index of Dental Anxiety and Fear (IDAF-4C+)	Armfield [20]	23	Dental fear and anxiety, dental phobia, fear of specific dental stimuli
Photo Anxiety Questionnaire	Stouthard, De Jongh, Hoogstraten [47]	10	Dental anxiety. The questionnaire contains non-verbal response scales
Kleinknecht's Dental Fear Survey (DFS)	Kleinknecht, Klepac, Alexander [48]	20	Fear about various situations and objects related to dental procedures
Gale's Ranking Questionnaire (RQ)	Gale [49]	29	Fear of specific dental situations

the dental procedure. According to Dailey et al. [50], the measurement of dental anxiety by questionnaires provides important information for the dentist and can also provide psychological benefits to the patient. Dailey et al. [50] checked whether informing the dentist about the level of dental anxiety before starting treatment reduces the level of state anxiety in the patient. The results showed that patients who informed the dentist about their level of anxiety before the treatment began were characterized by a lower level of anxiety compared to the patients who did not inform the dentist about the level of their anxiety.

The use of psychological methods to assess dental anxiety allows for a more reliable assessment of the patient's mental state before treatment and adjustment of dental procedures to the patient's needs [40]. As study results show, using the above methods is beneficial also due to the fact that subjective assessment of patient's emotional state by the dentist during a dental appointment is often not consistent with the actual condition of the patient [43]. Dailey et al. [50] emphasize that very few dentists use questionnaires to diagnose dental anxiety in their daily practice [50].

Dental anxiety therapy

What dentists can offer patients with severe dental anxiety is usually sedatives or general ana-

esthesia [5]. In the case of severe dental anxiety, psychological therapy is recommended, which may be accompanied by pharmacological therapy. Therapeutic procedures used in the treatment of dental anxiety usually contain elements of psycho-education [9]. Psychotherapy is usually cognitive, behavioural or cognitive-behavioural. Hypnosis is also used [25].

Most of the techniques involving psychological work with patients with a dental phobia are based on regular desensitisation [52]. Regular desensitization, in relation to dental stimuli, consists in displaying more and more fearful stimuli associated with dental appointments to the patient, who has been put into the state of relaxation. The patient is usually asked to visualize certain dental stimuli [53], which are also presented on the screen [54], or dental devices and dental office equipment are used [9].

An interesting therapeutic procedure, based on a regular desensitization, is described by Carlsson et al. [5]. As some patients may have problems with the visualization of dental devices or dental surgery, presentations of video recordings are used in this procedure. Such recordings contain various filmed dental treatments. Therapeutic sessions take place in a special room, arranged in a similar way to a dental office. During a therapy session, patients sit in a dental chair and watch films presenting dental procedures. Patients have the possibility to stop the film

when they begin to feel too tense. They stop the film by means of remote devices. Before starting therapy sessions, patients receive instructions to relaxation exercises to be done at home. To strengthen patients' relaxation skills, the biofeedback method is used. Thanks to this method, continuous monitoring of the patient's tension status is ensured. In this therapeutic procedure, emphasis is placed also on the cognitive aspects of dental anxiety, i.e. exploring and reformulating patient's thoughts and beliefs about dental procedures and the dental phobia.

Cognitive therapy of dental anxiety intends to change and restructure negative thoughts and increase control over such thoughts. Short-term behavioural-cognitive therapies are popular. The results of meta-analyses and review analyses of studies on the effectiveness of cognitive-behavioural therapy [9] confirm the effectiveness of this type of therapy in reducing dental anxiety, even in the case when these therapies are short-term and involve only several meetings with the patient. Working with such a type of patients involves concentrating on a specific symptom, and changing the way they think about dental treatment. It is very important to understand what exactly the patient is afraid of and why he or she is afraid of it, and also what the sources of dental anxiety are.

One of the latest forms of this kind of therapy is computer cognitive-behavioural therapy (C-CBT) [54]. It is a therapy that is easy to use in dental surgeries. It is based on psycho-education, exposure to anxious dental stimuli and cognitive restructuring. C-CBT therapy takes the form of a one-hour session based on a computer intervention supporting the patient in their coping with dental anxiety. The patient is sitting at the computer, with headphones on, but he or she can ask for help or ask the person conducting therapy a question at any time. C-CBT begins with a psycho-educational module, which gives the patient basic knowledge about dental anxiety. Then, the patient is guided through a short motivational interview, which helps analyse the benefits and losses related to the work undertaken over their dental anxiety issues. Later on, the patient does exercises based on the exposition to dental anxiety stimuli, during which they may practise dealing with their own dental anxiety. At the initial stage of exercises, the patient is asked to

choose three most frightening procedures out of the six given medical procedures, and arrange them from the least to the most frightening. The list of procedures includes: drilling and filling the cavity, teeth cleaning, injecting anaesthesia, root canal treatment, x-ray of the oral cavity and tooth extraction. Having arranged the procedures, the patient watches a film in which the procedures they chose – they are shown from the least to the most frightening one. For each procedure, there are three films. The first film shows how the procedure is done by a dentist and is accompanied by some basic explanations about what it involves. To aid the process of explanation, animations are occasionally played, containing details about the procedure. The second film also shows how the procedure is done, but the contents focus on the emotions experienced by the patient. The narrator provides basic information about the nature of emotions experienced by the patient and the ways in which they can handle these emotions. The third film presents a chosen procedure from the perspective of a patient sitting in the dental chair. The film exposes the elements of the frightening procedure more intensively. In this film, the narrator talks to the patient undergoing the given procedure about the effective ways of dealing with anxiety and the emotions experienced during the procedure [54].

Doering et al. [55] propose another approach to dental anxiety treatment, consisting in focusing on a traumatic dental experience from the past. They note that exposing patients who have a negative dental experience to aversive stimuli, as part of regular desensitization, may occur ineffective, or even aggravate dental anxiety by activating traumatic memories. Such patients could benefit more from the therapy involving concentrating on trauma. In the case of patients who work on their dental anxiety in the context of the post-traumatic stress, Doering et al [55] suggest the desensitization therapy which involves the eye-movement technique (EMDR) [56]. Dental anxiety therapy using EMDR was also described by De Jongh, Van Den Oord [57]. Work with patients suffering from severe dental anxiety which was carried out by Doering et al. [55] included several sessions. During the first session, negative memories about an aversive dental appointment were activated and distancing techniques used. Then, on a 10-digit scale, subjective

discomfort was assessed which accompanied the memories. Further on, eye movement exercises were introduced – series of 25–30 horizontal eye movements, repeated until the level of the subjective discomfort related to the negative memories reached 0. At the end of the session, the patient was instructed to conduct daily observations and note down new memories associated with trauma, as well as the dreams related to the trauma. The second and third session resembled the first one, and possibly included new memories about the traumatic dental experience. During the third session, the patient was prepared to confront future dental appointments by positively imagining himself or herself dealing with successful dental treatment. Studies conducted by Doering et al. [55], involving dental anxiety therapy given in such a form have proven highly effective.

Summary

The aim of the presented article was to analyse dental anxiety studies published so far, as well as review models attempting to explain the sources of this anxiety. The article also presented the most popular methods of anxiety measurement and therapeutic techniques used in the treatment of dental anxiety. Anxiety related to dental appointments constitutes a problem for both the patient and the dentist or dental assistant. It is a barrier to regular dental appointments, affecting oral and whole body health. Coping with dental anxiety requires knowledge about the nature and conditions of dental anxiety. Tellez et al. [8] point to the fact that little is still known about the factors which may affect the level of dental anxiety, including the factors contributing to the development and maintenance of various forms of anxiety disorders. For theoretical and application reasons, this complex phenomenon needs further empirical research, as well as organizing the knowledge obtained in the field of dental anxiety so far.

It is also worth noting that a moderate level of dental anxiety can be a kind of a warning signal, urging to take actions aiming to provide safety to the body, which means that a moderate level of anxiety can also bring some benefits and perform adaptive functions. In her classical concept of “work of worrying”, Janis [58] underlines positive aspects of moderate anxiety felt in the process of medical procedures. In her research, Janis

reports that patients with moderate preoperative anxiety are more prepared to cope in post-operative circumstances than the patients with a high or low level of preoperative anxiety. According to Janis, this is so because patients with a moderate level of anxiety develop better tolerance to stress, based on a realistic assessment of the situation. The same situation may occur in the case of dental anxiety. It might be the case that moderately anxious patients feel more motivated to take a better care of their oral hygiene. Presumably, also patients with a moderate dental anxiety – in comparison to the patients with a weak and severe dental anxiety – cope better when waiting for an imminent dental appointment, during the appointment and after it, thanks to a more rational approach to waiting and a better mental preparation for a certain level of a discomfort, inseparably associated with dental treatment. The above constitutes an interesting subject of empirical studies.

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