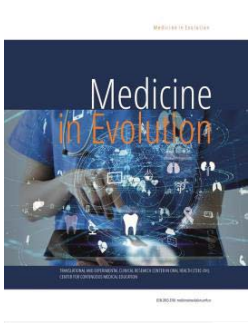
Anxiety Assessment in Children and Adolescents Caused by Dental Treatment



Lazăr C.F.[1], Popa M.[1], Luca M.M.[1], Nikolajević S.N.[1,2], Dragoş B.[1,2], Bratu D.C.[3], Buzatu R.[4]

[1]Department of Pediatric Dentistry, Faculty of Dental Medicine, "Victor Babeş" University of Medicine and Pharmacy, Timişoara
[2]Department of Pediatric Dentistry of Municipal Emergency Clinical Hospital, Timişoara
[3]Department of Orthodontics, Faculty of Dental Medicine, "Victor Babeş" University of Medicine and Pharmacy, Timişoara
[4]Department of of Dental Aesthetics, Faculty of Dental Medicine, "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania

Correspondence to:
Name: Popa Mălina
Address: Bd. Revolutiei 1989 no.9, Timișoara, Romania
Phone: +40 722406390
E-mail address: popa.malina@umft.ro

Abstract

Children exaggerated reactions to the felt fear can make it difficult and can even make dental treatment impossible under normal conditions. Dental fear, dental anxiety and dental phobia are three different ways of perceiving dental treatment, respectively three different ways of reacting to dental interventions.

This study is a retrospective study carried out between April - May 2019 in the Paedodontics Department of the Faculty of Dental Medicine, "Victor Babeş" University of Medicine and Pharmacy of Timişoara, and includes 1816 adolescent patients. The investigation method used was the questionnaire-based survey, applied to a representative sample of the adolescent population (aged 14-18) of Timişoara. Results show different variations in dental fear and dental anxiety according to sex, age groups, personal characteristics and other psychological and social factors.

It is important to follow therapeutic guidelines that allow us from the beginning to assess the patient's anxiety about dental treatment to create a comfortable environment for the patient so it will increase the acceptability of dental procedures and addressability to treatment.

Keywords: anxiety, dental fear, therapeutic protocol

INTRODUCTION

Practising dental treatment in children is difficult, and overcoming these difficulties becomes a real challenge for the doctor, if the patient has behavioural problems, refusing treatment.

Fear and anxiety continue to be a barrier to various medical practices for a considerable number of children [1] and its presence is a common situation among children [1,2].

Treating a difficult child can take a long time and sometimes, after long sessions in which an approach by non-pharmacological techniques is tried, the child will continue to refuse the dental treatment [3]. It is important to be able to determine the child's degree of anxiety in order to understand him and to be able to treat children most effectively.

An increasing number of children and adolescents perceive treatment in the dentist's office as a tense and stressful situation. The level of situations in which one can talk about collaboration problems in the dental office includes the cases in which the treatment is very difficult, requiring a lot of time, up to the extreme situation in which the treatment cannot be performed [4]. Refusal of dental treatment and dental fear are not synonymous, but they can coincide because a slight fear of dental interventions is normal in children [5-7]. We can refer to dental fear in the situation when the patient feels fear of a certain, well-defined thing, while anxiety is a generalized fear, a diffuse, anticipatory fear [7]. The distinction between the two (fear and anxiety) is unclear and it is difficult to establish exactly, especially in the dental office. Dental phobia is an increased degree of fear, which leads to the avoidance of dental treatment which is associated with a disproportionately high danger [8].

Anxiety can be of two types: acquired anxiety and innate anxiety. Acquired anxiety occurs in situations where consciously, due to previous experiences, we feel in danger and insecure, the patient's emotional balance being disrupted. This imbalance disappears when the causative factor is eliminated. Innate anxiety is defined as a continuous presence in the patient's subconscious, constituting an aspect of his personality. This is a person who tends to be constantly anxious and worried. The child will respond much more aggressively in situations that will cause him stress and that will give him the impression of a possible danger [9]. Questionnaires can be designed for the use in dental practice, and specialized studies have shown that are effective, and can assist the dentist in classifying the patient's behaviour [10,11].

Children's behavior in the dental office varies according to age, sex, temperament, personality, intellectual capacity, depending on previous medical experiences, family and cultural situation, all affecting their ability to cope with the experience in the dental office [12].

The dentist must be able to determine the patient's reactivity to medical treatment, in order to measure the patient's degree of anxiety in the dental office, there are several methods [13-17].

It is necessary to be able to correctly identify if a patient is anxious or phobic about dental treatment, thus being able to develop the correct treatment plan, respectively to choose the ideal method of approaching the patient. Depending on the degree of fear/anxiety of the patient, it is possible to opt for dental treatment under sedation or general anaesthesia. Adapted for children, there are a variety of techniques to determine the degree of fear of dental interventions: norms of behavior, psychometric scales, psychological measurements, etc.

The most commonly used questionnaires for children are [9-11, 17-20]:

1) Frankl Classification (Frankl; 1962) [21],

2) The Child Fear Survey Schedule (CFSS; Belfast version: Carson and Freeman 2000) [22],
3) Modified Child Dental Anxiety Scale (MCDAS; Wong et al. 1998) [23],
4) Venham Picture Scale (1979) [24],
5) Facial Image Scale (Buchanan 2002) [25];
6) Smiley Faces Program (SFP) [26],
7) Children's Dental Fear Picture Test (CDFP) [27].

Modified Dental Anxiety Scale

It is a questionnaire modelled after the Dental Anxiety Scale, to which was added questions regarding the administration of local anaesthesia [28]. The psychometric characteristics of the questionnaire are good and it should be completed easily and quickly, and the calculation of the result is easy and fast [29,30].

Studies have shown that completing this questionnaire in the waiting room does not amplify the feeling of fear [31-34].

If the patient gets a score of 19 or above, it can certainly be said that he has a high degree of anxiety and will require dental treatment under sedation or general anaesthesia [35].

The Modified Dental Anxiety Scale is a tool for determining fear of dental work used in many specialized studies [33,34], being translated into many languages: Spanish [36], Turkish [37], Greek [38] and Chinese [39].

Modified Dental Anxiety Scale for Children

This questionnaire is based on the Modified Dental Anxiety Scale, containing eight questions, with questions being added to distract the child from dental work and the thought of fear [23].

Venham Image Scale

This questionnaire [24] consists of eight images representing a child in two different situations, namely the positive, fearless and the negative, the anxious. The child will choose the image that corresponds to the way he feels (figure 1). Each negative image has a score of one point, while the positive image has a score of zero points [40].

This way of measuring dental anxiety in children has been used in a variety of studies [41-43] in order to determine the degree of anxiety of the child before starting dental treatment, its validity being proven [41,42].

Figure 1. Scale with images after Velham [43]

Facial Imaging Scale

This scale consists of a series of different facial images, from very happy to very sad. The child must show on one of the images the way he feels, respectively his perception for the dental manoeuvres. It can also be used during treatment to understand how the child perceives a certain intervention [25].

This way of determining the child's degree of anxiety about dental interventions proved to be easy to accept, the results being effective, thus helping the dentist to decide on the most appropriate approach, which will be necessary for the patient (figure 2) [40].

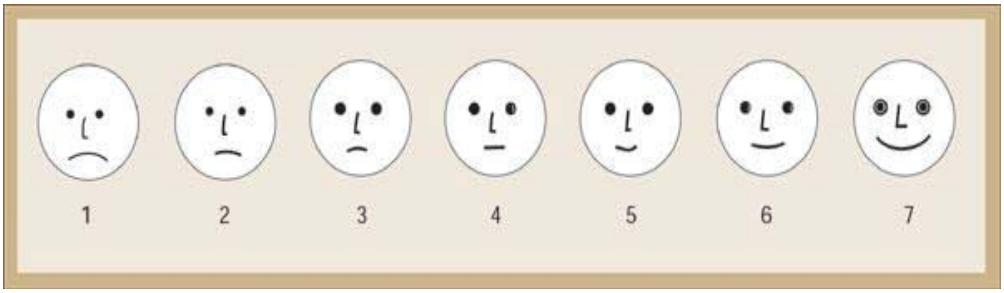


Figure 2. Scale with facial images [41]

Facial Imaging Program

It is an electronic questionnaire consisting of five questions based on the Modified Dental Anxiety Scale for Children, and seven different facial images, which help determine how the experience in the dentist's office is perceived by the child patient. The result is obtained directly from the computer, saving time from the doctor [26].

Dental Fear Imaging Test in Children

It is a questionnaire which in turn contains three sub-tests [27]:

- Choosing images with static elements from the dental office;

- Choosing images with situations from the dental office;
- Questionnaire with questions.

The test results divide children into three categories:

- Fearless, positive;
- Undecided, neutral;
- Fearful, negative.

It is a test frequently used to determine the degree of anxiety of the child, the results being effective [27,44].

Aim and objectives

The purpose of this study is to determine the level of anxiety among adolescents in terms of dental treatment and to identify factors that increase the anxiety level.

MATERIAL AND METHODS

This study is a retrospective study carried out between April - May 2019 in the Paedodontics Department of the Faculty of Dental Medicine, "Victor Babeş" University of Medicine and Pharmacy of Timişoara, and includes 1816 adolescent patients. The investigation method used was the questionnaire-based survey, applied to a representative sample of the adolescent population (aged 14-18) of Timişoara.

The questionnaire used in the investigation is MDAS (Modified Dental Anxiety Scale, MDAS; Humphris et al. 1995) [28], to which we added several items regarding: the initials of the name, the sex of the interviewee, his age, a question regarding the existence of dental health problems, two questions regarding the avoidance of visits to the dentist and the reasons for this avoidance and two questions regarding the acceptability of the dental treatment under sedation or general anaesthesia and the reasons for its possible rejection.

The inclusion criteria for the study were:

+ age of 14 years and not more than 18 years;
+ living in Timişoara.

The exclusion criteria for the study included:

- age under 14 years or over 18 years;
- living in another country than Timişoara

Data analysis was performed using graphical models and frequency, mean and standard deviation and, for comparative analysis, chi-square test (χ^2) for frequencies and t-test for averages. We considered a significance of 0.05 to be acceptable for comparative results [45].

RESULTS

The final group consisted of 1690 subjects, aged 14-18 years. The distribution by ages and sexes is presented in figure 3.

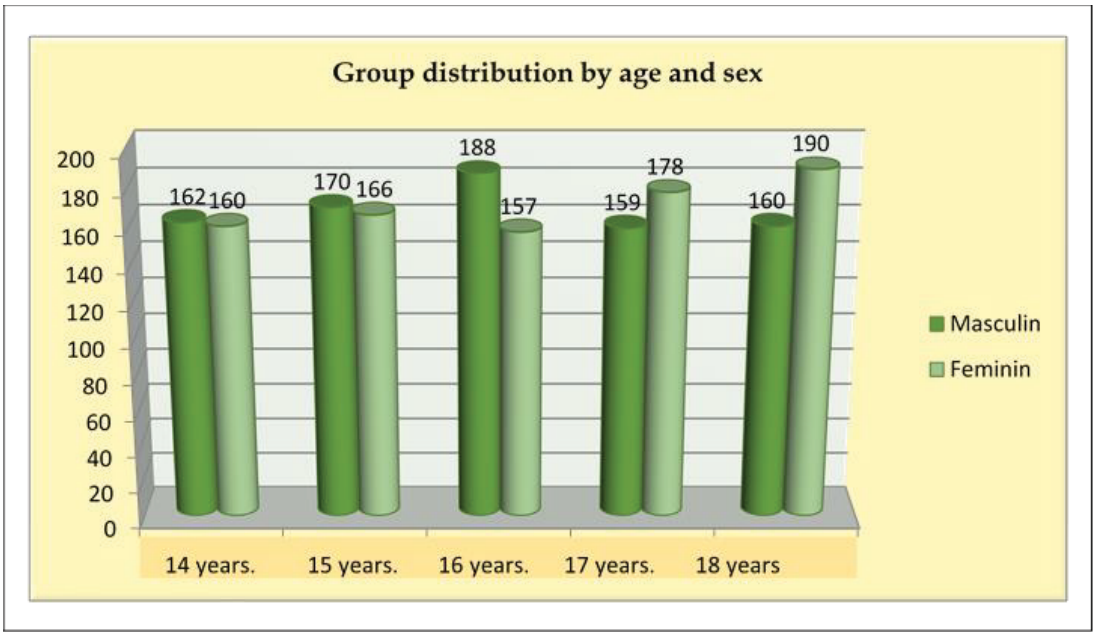


Figure 3. Group distribution by age and sex

The average age is 16.03 years with a standard deviation of 1.41. By sex, the mean age is m = 15.98 (d.s. = 1.39) for men, and m = 16.08 (d.s. = 1.43) for women. The difference between groups is statistically insignificant (F statistic = 2.23, T = 1.49, P = 0.1351), which leads to the conclusion of group homogeneity by age and sex.

Scores distribution obtained in the anxiety questionnaire of the interviewed subjects is presented in figure 4.

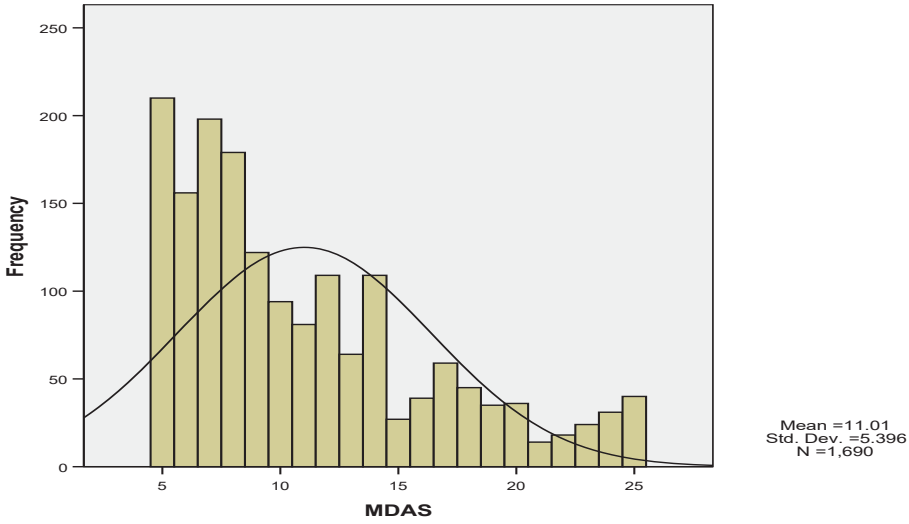


Figure 4. Histogram of MDAS scores obtained in adolescents group

We note that the distribution of scores does not overlap with the normal distribution, there is an obvious shift to the left of them, which is explainable by the fact that the normality in the case of our questionnaire is in the area of low scores, below 15.

Studying the frequency of MDAS scores obtained on the group of adolescents 10.1% (170 subjects) had average levels of anxiety (MDAS score = 15-18) and 11.7% (198 subjects) had severe anxiety levels (MDAS score> = 19).

Items of the MDAS questionnaire scores are presented in table 1.

Table 1. Mean and standard deviations of MDAS items

Control anxiety	Anxiety in the waiting room	Dental burs anxiety	Ultrasonic scaler anxiety	Anaesthesia anxiety
m=1.56 d.s.=0.91	m=1.85 d.s.=1.048	m=2.55 d.s.=1.26	m=2.05 d.s.=1.213	m=2.99 d.s.=1.353

There are different average levels of anxiety compared to different situations in the contact of individuals with the dentist (figure 5), the highest levels being for anaesthesia and drilling, average levels for scalling and waiting room and the lowest level for dental control. The differences between the averages are significant in all associations, finding a significance $p < 0.001$ for all associations, except for the association between waiting room anxiety and scalling anxiety, where the significance is 0.01.

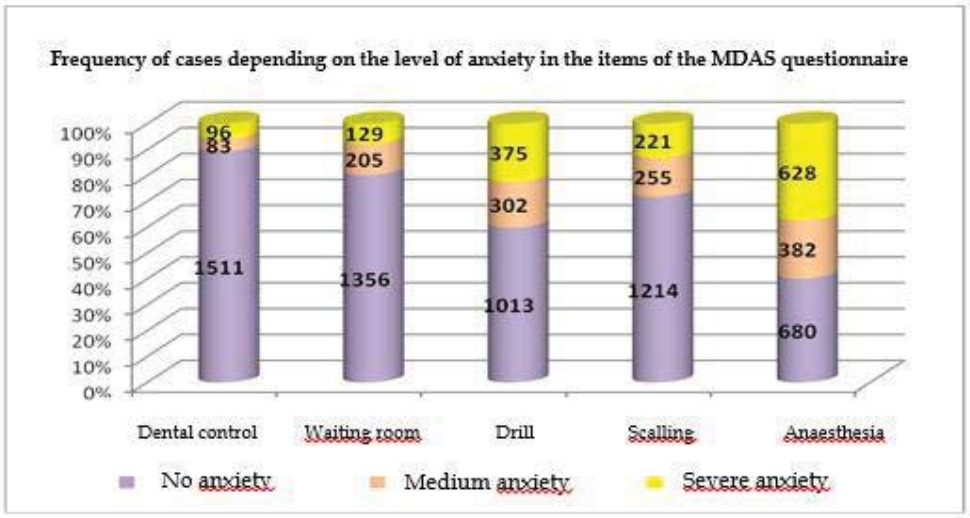


Figure 5. Frequency of cases depending on the level of anxiety in the items of the MDAS questionnaire

The existence of high rates of anxiety about anaesthesia can lead to difficulties in accepting dental interventions that need this procedure.

The anxiety levels reflected by the MDAS score related to the age of the interviewed subjects led to interesting results reflected in figure 6.

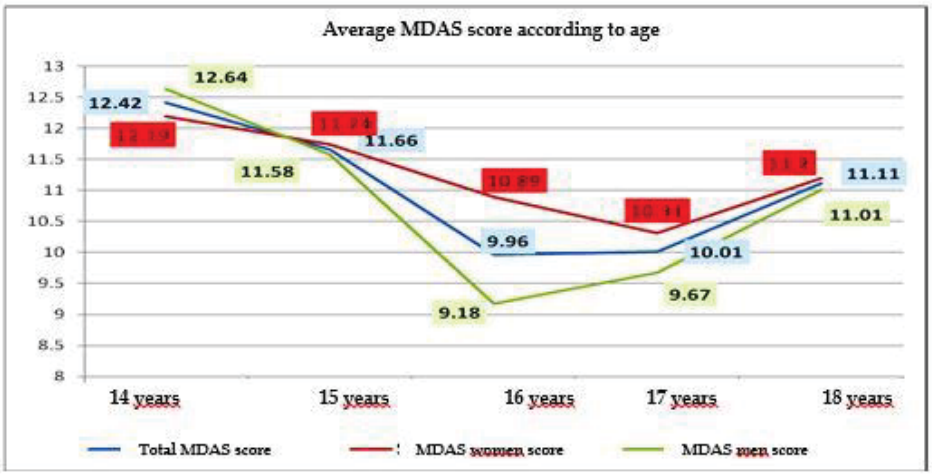


Figure 6. Average MDAS score according to age

We notice a general tendency to decrease the levels of anxiety reported, both for boys and girls up to the age of 16, in boys the decrease of scores between 15 and 16 years being intensely statistically significant (t = 4,588; p <0.001), so that between 16 and 17 years of age their growth will follow. In girls, the decline continues between 16 and 17 years. Between the ages of 17 and 18, there is an increase in both girls and boys. We cannot provide an explanation for this pattern of evolution of MDAS scores.

Analyzing the levels of anxiety by sex and age from a qualitative point of view, we notice some peculiarities (figure 7). Thus, although at 14 years of age boys tend to report significantly more severe anxiety than girls (χ^2 = 7.81; p = 0.005. At 15 years of age, significantly more girls report moderate anxiety (χ^2 = 10.74; p = 0.005), while for Severe anxiety the frequencies are relatively equal between the sexes, and for 16 and 17-year-olds the frequencies are relatively equal for both moderate and severe anxiety, the differences being statistically insignificant, so that at 18 years there are significantly higher frequencies of severe and general anxiety in boys. (χ^2 = 10.73; p = 0.001, respectively χ^2 = 10.86; p = 0.004).

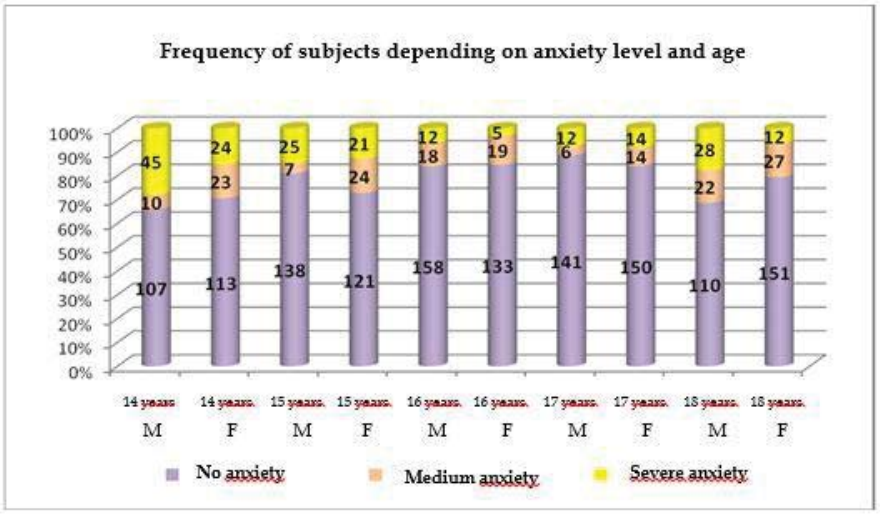


Figure 7. Frequency of subjects depending on anxiety level and age

The average scores on the MDAS items according to age are presented in figure 8.

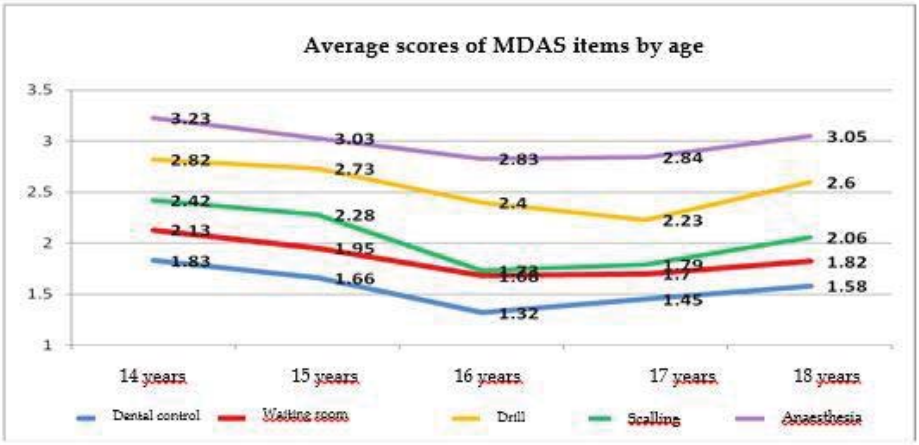


Figure 8. Average scores of MDAS items by age

We note that in all items there is a tendency to decrease the scores from the age of 14 to 16 years, and then there is an increase in the ages of 17 and 18, except for the anxiety for the

drill, whose decrease is kept for the age of 17 years. The final levels of anxiety (at the age of 18) are in all cases below the initial ones (at the age of 14), the difference being statistically significant for control anxiety ($p = 0.002$), anxiety in the waiting room ($p < 0.001$) and anxiety for scalling and brushing ($p < 0.001$), but without reaching significant levels for anxiety for local injection anaesthesia ($p = 0.115$) and anxiety for drilling ($p = 0.41$).

We can explain this evolution by the fact that probably, with maturation, the subjects begin to understand the need for dental treatment, so that they begin a process of self-education during which the denial of anxiety towards the dentist also appears. This explains the decreases that occurs for all items of the questionnaire up to the age of 16 years. The subsequent increase in scores indicates that there is, however, objective anxiety, which is ultimately accepted as such by individuals.

Anxiety levels at 18 years of age are not significantly lower than 14 years of age for potentially painful procedures (drilling and local injection anaesthesia), indicating that there is an objective level of anxiety for these procedures, which can be overcomed by education/self-education measures, anxiety that must be taken into account in routine dental practice and applied as far as possible measures to combat pain while performing these procedures.

DISCUSSIONS

The literature presents discordant data regarding the prevalence of anxiety, the data accessed by us from [37,46] report increased scores of dentist anxiety in women. Dumitrescu et al. [47] cite Maggirias et al. who report higher scores in men and Economou et al. and Settineri et al. which reports similar scores in women and men. We remind that in our group there is a relative tendency to higher scores in girls compared to boys, even if they do not reach the statistical significance. Where moderate and severe anxiety develops, there are higher levels of anxiety in boys. In groups with absent or low anxiety (MDAS <15), MDAS scores by sex are significantly higher in girls ($m = 9.11$, $ds = 2,838$, respectively in boys $m = 8.12$, $ds = 2,767$; $t = 6.42$, $p < 0.001$).

Fear of the dentist is a major cause for refusing dental treatment [5,18,48,49]. Dental fear is one of the most common emotional disorders encountered in modern society [50,51].

The behaviour of the child who refuses treatment in the dental office differs between age groups, personal characteristics and other psychological and social factors [4,52].

Common for these patients is that fear of dental interventions, considered to be the main reason for refusing dental treatment [4,52-56], but also to avoid contact with the dentist [52,57-60].

In Sweden, 1.3% of children and adolescents (0-19 years) require dental treatment in specialized clinics, where pharmacological elements of sedation are used to perform dental interventions [61].

Numerous studies show that not all children (aged 4 to 12 years) who refused dental treatment did so because of fear of dental interventions [5,6,18,49,62].

Various studies have associated temperament with the refusal of dental treatment, respectively with dental fear [63-66]. Refusal of treatment occurs most frequently in very active, impulsive children [6], while dental fear occurs most frequently in shy children [49,62,65].

A study conducted in Sweden [66] that evaluated the influence of temperament on the way the child accepts dental treatment, performed on preschool children who needed extractions, the manoeuvers being performed under sedation with Midazolam, showed that shy children find it much harder to accept dental interventions. Refusal of treatment occurs frequently in children with negative emotions, who are more agitated at the entrance to the waiting room.

Social influence has always been directly correlated with the child's physical and mental condition, and has a great influence on oral health. The relationship between socio-economic status and oral health is very well defined [67,68], it also influences the patient's physical health [69]. Physical and mental disorders occur most frequently in patients with poor or non-existent education, and in those with limited financial resources [70]. Raadal et. al. [71] has shown that lack of education and financial resources is a major risk factor for oral health. Socio-economic status and inter-family relationships influence the child's behaviour in the dental office, respectively a possible refusal of treatment by the child.

CONCLUSIONS

It is important for the dentist to be able to determine the child's anxiety level from the first phase of treatment in order to individualize the treatment plan according to the patient's psycho-emotional needs, to determine the need for local anesthesia treatment or if conscious sedation or general anaesthesia is needed.

Declaration of patient consent

The authors certify that they have obtained all the patient's consent forms. The patient, through his legal representative, consented for his clinical information to be reported under anonymity for medical and scientific research purposes.

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