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Anxiety, Stress and Coping Patterns in Children in Dental Settings

Nadica Pop-Jordanova[1], Olivera Sarakinova[2], Maja Pop-Stefanova-Trposka[2], Efka Zabokova-Bilbilova[3*], Emilija Kostadinovska[2]

[1]Macedonian Academy of Sciences and Arts, Skopje, Republic of Macedonia; [2]Faculty of Dentistry, European University, Skopje, Republic of Macedonia; [3]Department of Paediatric and Preventive Dentistry, Ss Cyril and Methodius University of Skopje, Faculty of Dentistry, Skopje, Republic of Macedonia

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***Correspondence:** Efka Zabokova-Bilbilova. Department of Paediatric and Preventive Dentistry, Ss. Cyril and Methodius University of Skopje, Faculty of Dentistry, Skopje, Republic of Macedonia. E-mail: efka_zabokova@hotmail.com

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Abstract

BACKGROUND: Fear of the dentist and dental treatment is a common problem. It can cause treatment difficulties for the practitioner, as well as severe consequences for the patient. As is known, the level of stress can be evaluated thought electrodermal activity, cortisol measure in saliva, or indirectly by psychometric tests.

AIM: The present study examined the psychological influence of dental interventions on the child as well as coping patterns used for stress diminution.

METHODS: We examined two matched groups of patients: a) children with orthodontic problems (anomalies in shape, position and function of dentomaxillofacial structures) (N = 31, mean age 10.3 ± 2.02) years; and b) children with ordinary dental problems (N = 31, mean age 10.3 ± 2.4 years). As psychometric instruments, we used: 45 items Sarason's scale for anxiety, 20 items simple Stress - test adapted for children, as well as A - cope test for evaluation coping patterns.

RESULTS: Obtained scores confirmed the presence of moderate anxiety in both groups as well as moderate stress level. For Sarason's test obtained scores for the group with dental problems are 20.63 ± 8.37 (from max 45); and for Stress test 7.63 ± 3.45 (from max 20); for the orthodontic group obtained scores are 18.66 ± 6.85 for Sarason's test, while for the Stress test were 7.76 ± 3.78. One way ANOVA confirmed a significant difference in values of obtained scores related to the age and gender. Calculated Student t - test shows non-significant differences in obtained test results for both groups of examinees. Coping mechanisms evaluated by A - cope test shows that in both groups the most important patterns used for stress relief are: developing self-reliance and optimism; avoiding problems and engaging in demanding activity.

CONCLUSION: This study confirmed that moderate stress level and anxiety are present in both groups of patients (orthodontic and dental). Obtained scores are depending on gender and age. As more used coping patterns in both groups are developing self-reliance and optimism; avoiding problems and engaging in demanding activity. Some strategies for managing this problem are discussed.

Introduction

Dental fear usually indicates an unpleasant emotional reaction to specific threatening stimuli occurring in situations associated with dental treatment, while dental anxiety is an excessive and unreasonable negative emotional state experienced by dental patients.

Anxiety, fear and perceived stress in the dental setting are common worldwide. These problems are particularly related to the pediatric dentistry. It was assumed that fear and anxiety have a mean prevalence between 10% and 20%, being very high in the earliest ages [1].

Statistics show that people from low socioeconomic status groups reported a higher level of dental fear than those individuals from high socioeconomic groups. The reported incidence of high dental fear and anxiety was 10% in an Icelandic study, but slightly higher in Singaporean population (17.1%). A cross-cultural study of Chinese and Danish patients reported moderate to high dental fear in 30% of Chinese and 15% of Danish participants. In 2009, a study of dental fear prevalence in the Netherlands reported 24.3% of the participants had moderate to high dental fear. Dental fear studies on German

populations have reported a mean Dental Anxiety Score of 8.6 and a dental phobia incidence of 11%. The highest prevalence of dental fear appears to be in Japan, where a study of 3041 students and adults reported that 42.1% had high dental fear [2].

However, perceived stress in dental setting can arise in both, patients as well as in dental practitioners. Many studies demonstrated that stress in dental practitioners arises from pediatric examination and treatment and can be broadly divided into those produced by the child and those produced by the child's guardian (usually the mother). On the other side, the patients (children) usually manifest some discomfort in a dental setting, which could be manifested as anxiety, worry or stress. In some patients, this anxiety can be so high and be presented as odontophobia. Fearful patients might neglect their teeth and oral hygiene and avoid any treatment procedures.

Processes known to contribute to the aetiology of dental fear and phobia include a variety of genetic, behavioural, and cognitive factors. Genetic vulnerability factors may interact with other etiological elements that cause a phobia.

The theory of classical conditioning explains acquired fear as a result of previous negative or traumatic experiences. Consequently, negative experiences during dental treatment are possible factors that promote dental anxiety, and several studies have findings that support this [3].

In our previous study [4] in a sample of 50 schoolers, we showed the presence of high anxiety level among all children undergoing dental intervention. There were differences in anxiety scores between girls and boys, girls having higher scores. Personality characteristics (evaluated with Eysenck personality questionnaire) showed low psychopathological traits, moderate extroversion and neuroticism, but accentuated insincerity (evaluated with L scale). We did not find a correlation between personality traits (obtained scores for EPQ) and anxiety, except for the neuroticism which was positively correlated with the level of anxiety.

This study aimed to evaluate anxiety and perceived stress in two groups of patients: orthodontic and dental, and to elaborate the patterns of coping mechanisms patients use to mediate the stress level.

Methodology and Sample

The evaluated sample comprised two groups of schoolers: a) children with orthodontic problems (anomalies in shape, position and function of dentomaxillofacial structures) (N=31, mean age 10.3 ± 2.02 years); and b) children with ordinary dental problems (N= 31, mean age 10.3 ± 2.4 years). Both genders were presented equally. Examinees were randomly selected.

The following psychometric tests were used: Sarason's General Anxiety Scale, Stress test for children and A-Cope questionnaire for assessing coping style.

The Sarason's General Anxiety Scale for Children (GASC) is a 45-item yes/no scale for use with children (grades 1-9). It measures chronic, generalised anxiety. The obtained score of 12 or below ranks in the low anxiety range. A score of 12-20 ranks in the medium range. Any score above 20 signifies high anxiety. Scoring 15 or higher is a good indication that a child experiences considerable discomfort about the situation in which he is [5].

Stress-test is a simple yes/no 20-item questionnaire where the higher scores are related to higher stress level [6].

The A-COPE is a coping inventory designed to explore children's coping behaviors that result from the normal stress associated with trying to create a balance between being connected to and at the same time independent from one's family [7]. The coping inventory identifies the behaviors children find helpful in managing problems or difficult situations. The A-COPE can be used as one single scale or broken into 12 sub-scales that reflect 12 different coping patterns: 1) ventilating feelings (like yelling and blaming), 2) seeking diversions (like sleeping or watching TV), 3) developing self-reliance and optimism (like organizing his/her life), 4) developing social support (like helping others solve their problems), 5) solving family problems (like working through family rules), 6) avoiding problems (like substance use or ignoring the problems), 7) seeking spiritual support (like talking to clergy), 8) investing in close friends (like boyfriends or girlfriends), 9) seeking professional support (like getting help from a counselor), 10) engaging in demanding activity (like strenuous physical activity or academically challenging activity), 11) being humorous (like making a joke of the situation), and 12) relaxing (like listening to music). Psychological tests in this study were applied prior to dental intervention. Children were usually accompanied by their mothers and they gave prior consent for the study.

For statistical calculations, the online package Statistics 8 was used.

Results

Two groups of examinees were included: a) 31 children with orthodontic problems, mean age 10.3 ± 2.02 years; and b) 31 children with simple dental problems, mean age 10.3 ± 2.4 years. Examinees

were matched by age and gender.

Evaluated by Sarason's anxiety test the obtained scores for the group with dental problems were: 20.63 ± 8.37 (from max 45); these results correspond to moderate anxiety level. Evaluated by Stress test 7.63 ± 3.45 (from max 20), which correspond to small stress level. The obtained scores in the orthodontic group were: 18.66 ± 6.85 using Sarason's anxiety tests and 7.76 ± 3.78 using Stress test (Fig. 1).

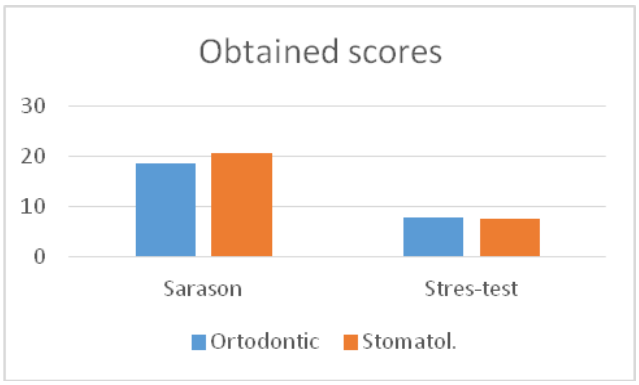

Figure 1: Obtained scores for both psychometric tests in orthodontic and dental patients

Calculated one-way ANOVA showed a significant variance in scores obtained using Sarason's anxiety scale related to age in both groups of patients.

Calculated one-way ANOVA for the significance of age in stress test is presented in Table 1. In this calculation results also confirmed the influence of the age on the variance of obtained scores.

Table 1: ANOVA-related-age and scores using stress-test in both groups

a)

Effect	SS	Degr. of Freedom	MS	F	p
Intercept	2229.803	1	2229.803	400.6634	0.000000
Stres test	110.125	11	10.011	1.7989	0.129696
Effor	100.175	18	5.565		

b)

Effect	SS	Degr. of Freedom	MS	F	p
Intercept	2514.056	1	2514.056	539.8604	0.000000
Stres test	43.800	12	3.650	0.7838	0.660721
Effor	79.167	17	4.657		

Correlation between age and scores evaluated by Sarason's anxiety test is shown in Fig. 2. There was a small positive correlation between the two mentioned variables.

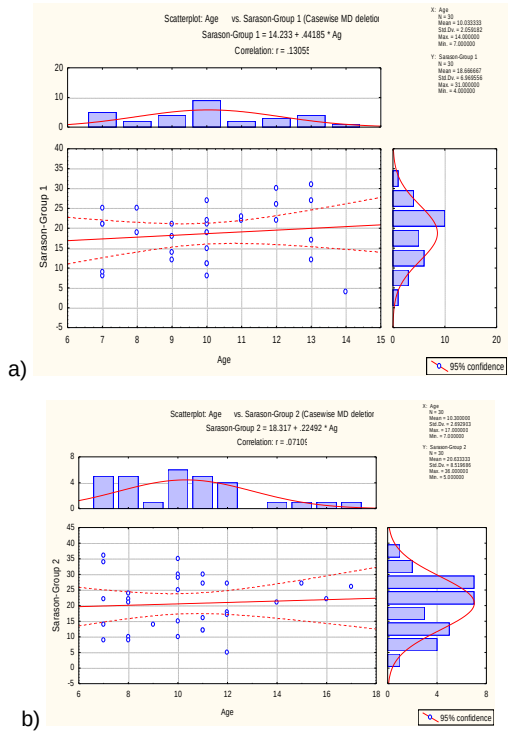

Figure 2: Correlation between age and scores obtained with Sarason's anxiety test

Correlation between scores obtained with Stress-test for both groups of patients is presented on Fig. 3.

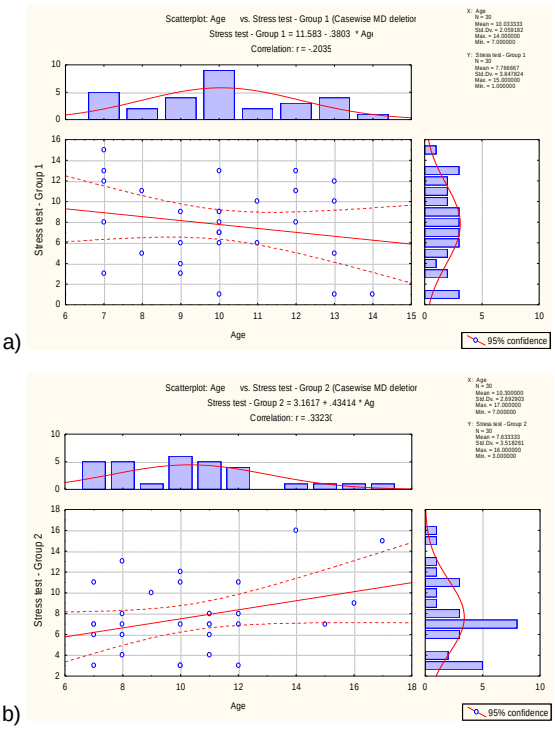

Figure 3: Correlations between age and obtained scores with Stress-test in both groups of examinees

As it can be seen, the correlation between age and obtained scores using Stress-test is negative

for orthodontic patients but positive for dental patients.

Finally, we used Student's t-test for obtained scores in both groups for both psychometric tests (Fig 4 and 5).

T-test for Independent Samples (Copy of sarakinova-excel 97)
Note: Variables were treated as independent samples

Group 1 vs. Group 2	Mean Group 1	Mean Group 2	t-value	df	p	Valid N Group 1	Valid N Group 2	Std.Dev. Group 1	Std.Dev. Group 2	F-ratio Variances	p Variances
Sarason-Group 1 vs. Sarason-Group 2	18.66667	20.63333	-0.97861	58	0.331834	30	30	6.969556	8.519686	1.494297	0.285218

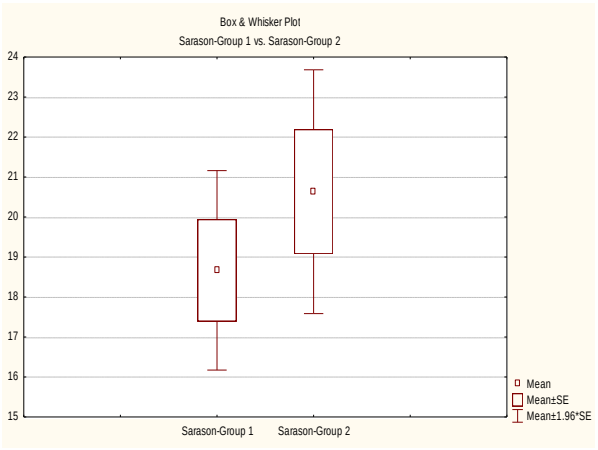

Figure 4: T-test for scores obtained with Sarason's anxiety test in both groups

The Student's t-test showed no significant differences in obtained scores for both tests in both groups of examinees.

T-test for Independent Samples (Copy of sarakinova-excel 97)
Note: Variables were treated as independent samples

Group 1 vs. Group 2	Mean Group 1	Mean Group 2	t-value	df	p	Valid N Group 1	Valid N Group 2	Std.Dev. Group 1	Std.Dev. Group 2	F-ratio Variances	p Variances
Stress test - Group 1 vs. Stress test - Group 2	7.766667	7.633333	0.140065	58	0.889090	30	30	3.847824	3.518261	1.196115	0.632837

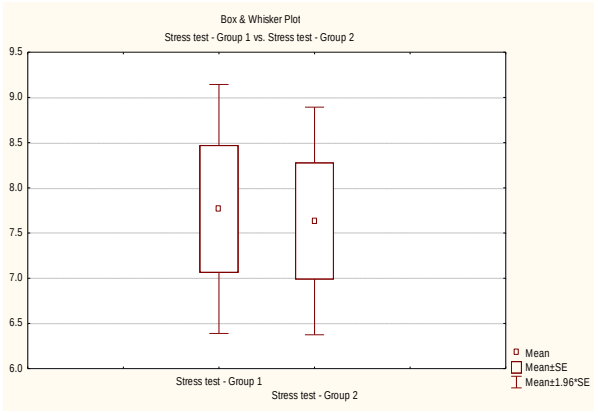

Figure 5: T-test for scores obtained with Stress-test in both groups

Coping can be defined as a set of cognitive and effective actions that arise in response to a particular concern. They represent an attempt to restore the balance or remove the turbulence for the individual. This may be done by solving the problem (removing the concern) or accommodating the concern without bringing about a solution.

The A-COPE applied in this research can be used as one single scale or broken into 12 sub-scales that reflect 12 different coping patterns: 1) ventilating feelings (like yelling and blaming), 2) seeking diversions (like sleeping or watching TV), 3) developing self-reliance and optimism (like organizing his/her life), 4) developing social support (like helping others solve their problems), 5) solving family problems (like working through family rules), 6) avoiding problems (like substance use or ignoring the problems), 7) seeking spiritual support (like talking to clergy), 8) investing in close friends (like boyfriends or girlfriends), 9) seeking professional support (like getting help from a counselor), 10) engaging in demanding activity (like strenuous physical activity or academically challenging activity), 11) being humorous (like making a joke of the situation), and 12) relaxing (like listening to music).

The obtained all 12 coping patterns for patients in both groups are presented in Fig. 6.

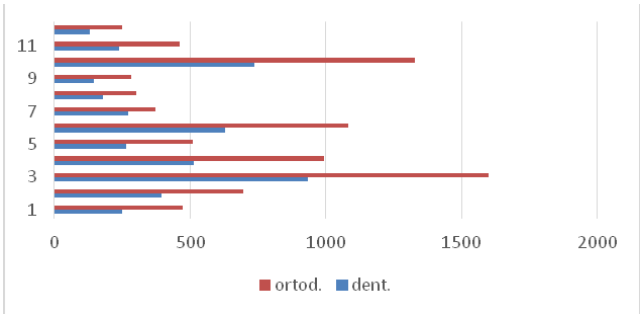

Figure 6: Obtained 12 coping patterns in both groups of patients

Coping mechanisms evaluated by A-cope test showed that in both groups the most important patterns used for stress relief were: developing self-reliance and optimism (3); avoiding problems (6) and engaging in demanding activity (10).

Discussion

The results of our study revealed the presence of moderate anxiety and relatively low-stress level in evaluated school children in both groups (orthodontic and dental settings). These results differ from our previous study [8] where they obtained anxiety scores were more accentuated and higher for girls compared to boys. We suppose that pretreatment preparation organised in the last period, as well as teaching children for the necessity of oral hygiene in elementary school, are very important for diminishing anxiety/stress manifestations. Our results are quite similar to the other studies in this context.

In a recent study published by Nelson et al., 2015 [8], the aim was to identify factors related to young children's distress during preventive oral health visits. The study showed that the majority of parents report that young children experience moderate to severe distress during preventive dental treatment. Pre-examination distress and difficulty with prior medical examinations and immunisations are

significantly associated with distress during dental exam. Additionally, it was suggested that dental providers could help parents of young children to develop a habit of routine pediatric preventive care by anticipating child behaviours, informing parents about possible child reactions, providing parent coaching, and altering their style to facilitate a positive experience.

A similar study related to anxiety in dental practice was performed by Storjord et al., 2014 [3]. The authors compared dental anxiety in students of dentistry, biology, and psychology and showed that dental students demonstrated a lower degree of dental anxiety compared to psychology students and biology students. Senior dental students with clinical experience also showed a lower dental anxiety level than junior dental students. The practice-oriented dentistry education at the university might contribute to the differences in anxiety levels between new and experienced dentistry students.

Having in mind that dental fear and anxiety are strong negative emotions associated with dental treatment especially among children and adolescents, Cainetti et al., 2017 [9] conducted a meta-analysis about interventions used to diminish these problems. Two main techniques were analysed: pharmacological and non-pharmacological. Non–pharmacological interventions can be theoretically grouped into improved communication skills, rapport and trust building; behaviour modification techniques; cognitive behavioural therapy and physical restraints. Authors supported the second approach as more available and useful. In an earlier study, Hunter et al., 1990 [10] proposed rectally administered methohexital as a safe, effective sedative to ameliorate the stress of the dental surgical experience for the uncooperative child.

Unlike dental care for adults, care for young children necessitates a triadic relationship among the patient, parent, and clinician. Research demonstrates that the dental fear of a child who is 8 years or younger is significantly related to the dental fear of the parent. Emotional aspects of the dental experience, for the child and the parent, influence a parent's decision to return for subsequent dental visits [11].

Recommendations derived from the literature suggest that medical providers' use of distraction, nonprocedural talk, breathing exercises, specific directions to the child, and physical contact such as bouncing, patting, and rocking may improve a child's reaction to care. It has also been suggested to use the live or Filmed modelling technique as an effective intervention to prepare the child for a dental visit [12].

Interventions which can be useful for fear diminution are cognitive behavioural therapy, relaxation therapy, computer-assisted relaxation learning, hypnotherapy, group therapy, individual systematic desensitisation, pharmacological, flooding (implosion), and swallowing relaxation. These forms of treatment are essentially a form of counter conditioning to reverse the fear/anxiety into a state of acceptance and calm. Our own experience with peripheral biofeedback procedure showed a very positive effect to stress diminishing in different groups of children-patients [13] [14]. We strongly recommend the use of this technique.

In conclusion, the study confirmed moderate anxiety and relatively normal stress level in school children undergoing orthodontic and dental interventions. The obtained scores for psychometric tests are significantly different according to age (one-way ANOVA). No significant differences were obtained between mean values of scores in both groups of examinees and for both psychometric tests (t-test was > 0.05). Using the Sarason's anxiety test a very small positive, but not significant correlation was obtained for age and scores ($r = 0.13$; $r = 0.7$, respectively). Using the Stress-test, calculated correlations between age and scores differ: it was positive for dental ($r = 0.33$) and negative for an orthodontic group of patients ($r = -0.20$), but without statistical significance. Three main coping patterns were used for stress mediation in the evaluated children: developing self-reliance and optimism (3); avoiding problems (6) and engaging in demanding activity (10).

We recommend the use of peripheral biofeedback for diminishing anxiety and stress as an easy to apply and highly cost-benefit procedure in children.

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