Structural Analysis of Dental Fear in Children with and Without Dental Trauma Experience

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ABSTRACT

The aim of the study was to evaluate dental fear in children with and without dental injuries in a randomly selected children in Croatia (59 girls and 88 boys). Children were divided into three groups depending on dental trauma experience. They were also divided into two age groups: 5–8 and 9–12 years. Only dental trauma to the permanent teeth was included in the study. The CFSS–DS, CDAS and CMFQ were used for evaluation of dental anxiety and the ISP Hollingshead Index of Social Position was calculated for evaluation of social status. The mean values of CDAS, CFSS-DS and CMFQ tests revealed that the anxiety level decreases with increasing experience of dental injury. The analysis of variance performed for CDAS showed a significant difference between children with and without dental trauma (p = 0.010). Regarding the groups, the analysis of variance for CMFQ (p = 0.021) and CFSS-DS (p = 0.001) showed a significant difference, as well as regarding age (CMFQ; p = 0.001 and CFSS-DS; p = 0.016). Cronbach’s alpha coefficients revealed the highest reliability for CFSS-DS (α = 0.910). Pearson’s correlation coefficients revealed significant correlations between the anxiety scores, age and ISP values for children without dental trauma, and between the anxiety scores and age for children with repeated dental trauma. The results of the ISP Hollingshead Index exhibited the highest frequency in children with dental injuries who belonged to the families with poor social background (ISP = 44–60). No significant difference was obtained between children with and without dental injuries depending on either gender or the ISP value.

Key words: dental anxiety, dental trauma, age, social status

Introduction

Traumatic dental injuries in children and adolescents represent a serious dental public health problem, which results in functional, esthetic and psychological disturbances.1,2 Dental injuries are regarded as emergencies and are related to objective pain experience that must be treated promptly, particularly in children.3

It has been known from the literature that children with a painful experience perceived at an early age are expected to have a higher risk to develop dental anxiety, which is a serious reason for avoidance of dental treatment later in life.4,5 The objective assessment of children’s pain constitutes a challenge for health professionals, because it is a complex, multidimensional phenomenon associated with the feeling of being hurt. In children with dental trauma experience, dental fear and anxiety are direct consequences of a negative sensation associated with the pain caused by this traumatic injury.9 This negative sensation represents a defensive mechanism in an objective threatening situation, which might consequently prevent the child from further injuries.10 Depending on a child’s age and a level of its cognitive abilities, variations in experiencing, understanding, reporting and remembering pain considerably differ. Children’s reports of pain experience follow a sequence of psycho-physiological stages determined by their general cognitive development.11 Young children are usually not able to verbally interpret pain, whereas older children of 12 years and over are expected to explain pain in a rather sophisticated way because they can understand why pain hurts.8,11 The purpose of this study is to evaluate the structure of dental fear in children with and without dental trauma experience, by using different psychometric measurements which have been standardized and widely used for evaluation of dental fear in children.

Received for publication May 25, 2007
Material and Methods

The study was performed on a sample of 147 randomly selected patients (59 girls and 88 boys). All patients were treated in the dental settings of the Department of Clinical Pedodontics, Faculty of Medicine, University of Rijeka, and the Department of Paediatric Dentistry, School of Dental Medicine, University of Zagreb, Croatia. The study was reviewed and approved by the Ethical Committee of the Faculty of Medicine, University of Rijeka, Croatia. The age of the examined patients ranged from 5–8 and 9–12 years.

Participants were divided into two groups: patients without dental trauma (n=49) and with dental trauma experience (n=98). Only patients with dental trauma to the permanent teeth were included in the study. Data related to the patient’s age, gender and dental status, type of injured teeth and type of dental trauma, previous trauma history, was taken from the dental records of children who referred to the clinic. For the purpose of the study classification of dental trauma injuries, proposed by the WHO was used. Psychometric measurements usually used for evaluation of dental anxiety were applied in the study. Socioeconomic status was evaluated by the Hollingshead Two-Factor Index of Social Position.

The Children’s Fear Survey Schedule – Dental Subscale (CFSS-DS) questionnaire, which covers different aspects of dental and medical situations, was used to measure dental anxiety. The possible response to each item was scored between 1 (not afraid) and 5 (very afraid) and the total scores ranged between 15–75. According to the CFSS_DS test, children with the scores ≥45 can be defined as dentally anxious.

The Corah Dental Anxiety Scale was used to measure fear in children (CDAS) and their parents (PDAS). Patients were asked to rate their fear on a five-point scale in different dental situations. The results have a possible score range between 4 and 20. According to the CDAS test children are considered as low anxious (CDAS = 4–8); moderately anxious (CDAS = 9–12) and highly anxious (CDAS = 13–20).

Short Dental Anxiety Inventory test (S-DAI) also covering different aspects of fear provoked by dental procedures and situations, has the total score range between 9 and 45.

Hollingshead Two Factor Index of Social Position (ISP) questionnaire was applied for the purpose of evaluating socio-economic background of the family in which the child was raised up. According to this test, families with the high ISP index indicate low socio-economic status, and conversely.

Broome’s Child Medical Fear Questionnaire (CMFQ) questionnaire consisting of 12 items, refer to different aspects of medical situations and was used to measure different aspects of medical fear. The results have a possible score range between 12 and 36.

Statistical analysis

Statistical analysis was performed by using and SPSS for Windows, Release 7.5. The differences in dental anxiety between boys and girls, and the groups with and without dental trauma were performed by the analysis of variance (ANOVA) and compared by using an independent t-test. The consistency concerning dental anxiety scores obtained by different instruments was verified by using Pearson’s correlation coefficients. The reliability of the tests was performed by calculating Cronbach’s α coefficients. By calculating the mean scores children were defined as low and/or moderate, and highly anxious.

Results

Figure 1. refers to the results representing the frequencies for the groups of children without dental injury, and with isolated and repeated dental injury, in relation to the results obtained for the Hollingshead Two-Factor Index of Social Position. In general, the higher the ISP values are, the lower the social status is. The highest frequencies regarding all three groups of children are obtained for quite high ISP values (ISP = 44–60). For quite high ISP values (ISP=28–43 and ISP=44–60), the frequencies of children with repeated dental injury are higher in comparison with the groups of children without or with isolated dental trauma. With increasing the ISP values, the frequencies of children with repeated dental injury also increases. The exception is represented for the lowest and the highest ISP values, where the frequencies of children with repeated dental injury show the lowest value in comparison with the other two groups.
of children. Particularly for the lowest ISP value (ISP = 11–17), representing the highest social status of the family, there are no children with repeated dental injury (Figure 1).

The CDAS results show a significant difference in dental anxiety between the examined groups of children, i.e., children without dental trauma, with isolated dental trauma and repeated dental trauma injury experience (p=0.010) (Table 1 and Table 2).

The CMFQ results, representing children's medical fear, proved a significant difference in dental anxiety between the examined groups of children (p=0.021) as well. According to the same results, there is also a significant difference in dental anxiety between male and female participants (p=0.001) (Table 3 and Table 4).

The CFSS-DS results proved a significant difference in dental anxiety between children without dental trauma, with isolated and repeated dental trauma experience as well (p=0.001) (Table 3). According to these results, there is also a significant difference in dental anxiety between males and females (p=0.016) (Table 5 and Table 6).

Correlation coefficients between the anxiety scores obtained by different instruments showed a significant correlations for the group of children without dental trauma experience (Table 7). A significant correlation is obtained between children’s dental anxiety and socioeconomic status of the family, as well as between children’s dental anxiety and parental dental anxiety, as measured by S-DAI test (p<0.05) (Table 7). Parental dental anxiety also proved a significant correlation with socioeconomic status of the family (p<0.01) (Table 4). According to the CMFQ results, a significant correlation between children’s age and fear of medical treatment proved that younger children are more afraid of the dentist (p<0.05) (Table 7).

Correlation coefficients between the anxiety scores obtained by different instruments showed a significant correlations for the group of children with repeated dental trauma injuries (Table 8). According to the CMFQ results, a significant correlation is obtained between children’s age and their fear of medical treatment, proving that younger children are more feared of the dentist (p<0.05) (Table 5). A significant correlation between the CFSS-DS results and children’s age proved that younger participants are more afraid of the dentist as well (p<0.05) (Table 8).

**Discussion**

It is not rare in the routine clinical practice to meet children with manifested dental anxiety who in their anamnesis approve of previous dental trauma injury. Dental trauma without any doubt represents a directly conditioned negative and uncomfortable, rather painful and fear provoking experience, which might contribute to the appearance of dental anxiety.22,23

**TABLE 1**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Gender</th>
<th>CDAS Mean</th>
<th>Num. of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children without DT</td>
<td>Male</td>
<td>9.91</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>9.27</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>9.57</td>
<td>49</td>
</tr>
<tr>
<td>Children with isolated DT</td>
<td>Male</td>
<td>7.93</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>8.33</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>8.09</td>
<td>69</td>
</tr>
<tr>
<td>Children with repeated DT</td>
<td>Male</td>
<td>7.39</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>8.83</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7.69</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>Male</td>
<td>8.31</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>8.80</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>8.50a</td>
<td>147</td>
</tr>
</tbody>
</table>

a grand mean, DT – dental trauma injury

<table>
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<tr>
<th>Covariates</th>
<th>Age</th>
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<th>1</th>
<th>9.127</th>
<th>1.115</th>
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<td>(Combined)</td>
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<td>26.357</td>
<td>3.220</td>
<td>0.025</td>
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<tr>
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<td>2</td>
<td>38.993</td>
<td>4.764</td>
<td>0.010</td>
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<tr>
<td>Gender</td>
<td>1.086</td>
<td>1</td>
<td>1.086</td>
<td>0.133</td>
<td>0.716</td>
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</tr>
<tr>
<td>Interactions</td>
<td>Groups*Gender</td>
<td>16.626</td>
<td>2</td>
<td>8.313</td>
<td>1.016</td>
<td>0.365</td>
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<tr>
<td>Model</td>
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<td>6</td>
<td>17.471</td>
<td>2.134</td>
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<tr>
<td>Residual</td>
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<td>140</td>
<td>8.185</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
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<td>146</td>
<td>8.567</td>
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</table>

a sum of squares, b mean square
lated that children with such painful experiences are expected to be more prone to developing higher dental anxiety.\textsuperscript{6,7} But, it is still not known to which extent children’s manifested anxious behavior and fears could be due to previously suffered dental injuries or rather intrinsic/extrinsic factors involved in the etiology of dental anxiety. For this reason, the present study evaluates the structure of dental anxiety in children with and without dental trauma experience.

The assumption based on the acquired results is that the group of children without dental trauma have a higher level of dental anxiety, as well as that younger children exhibit more anxious behaviour to a larger extent in comparison with the older ones.

The first can be explained by the »flooding theory«, whereas the latter is pretty much known from the previous literature.

\begin{table}[h]
\centering
\caption{CHILD MEDICAL FEAR QUESTIONNAIRE (CMFQ): TOTAL MEAN VALUES, MEAN VALUES FOR CHILDREN WITHOUT DENTAL TRAUMA, WITH ISOLATED DENTAL TRAUMA AND REPEATED DENTAL TRAUMA INJURY DEPENDING ON AGE AND GENDER}
\begin{tabular}{|c|c|c|c|c|}
\hline
Groups & Age & Gender & CMFQ & Num. of Cases \\
\hline
\multirow{3}{*}{Children without DT} & 5–8 years & Male & 18.55 & 11 \\
& & Female & 17.21 & 19 \\
& & Total & 17.70 & 30 \\
& 9–12 years & Male & 15.42 & 12 \\
& & Female & 15.57 & 7 \\
& & Total & 15.47 & 19 \\
& Total & Male & 16.91 & 23 \\
& & Female & 16.77 & 26 \\
& & Total & 16.84 & 49 \\
\hline
\multirow{3}{*}{Children with isolated DT} & 5–8 years & Male & 16.10 & 10 \\
& & Female & 16.06 & 16 \\
& & Total & 16.08 & 26 \\
& 9–12 years & Male & 14.94 & 32 \\
& & Female & 15.09 & 11 \\
& & Total & 14.98 & 43 \\
& Total & Male & 15.21 & 42 \\
& & Female & 15.67 & 27 \\
& & Total & 15.39 & 69 \\
\hline
\multirow{3}{*}{Children with repeated DT} & 5–8 years & Male & 16.33 & 6 \\
& & Female & 21.00 & 2 \\
& & Total & 17.50 & 8 \\
& 9–12 years & Male & 14.35 & 17 \\
& & Female & 13.25 & 4 \\
& & Total & 14.14 & 21 \\
& Total & Male & 14.87 & 23 \\
& & Female & 15.83 & 6 \\
& & Total & 15.07 & 29 \\
\hline
Total & 5–8 years & Male & 17.15 & 27 \\
& & Female & 16.92 & 37 \\
& & Total & 17.02 & 64 \\
& 9–12 years & Male & 14.87 & 61 \\
& & Female & 14.91 & 22 \\
& & Total & 14.88 & 83 \\
& Total & Male & 15.57 & 88 \\
& & Female & 16.17 & 59 \\
& & Total & 15.81 & 147 \\
\hline
\end{tabular}
\textsuperscript{a} grand mean, DT – dental trauma injury
\end{table}

\begin{table}[h]
\centering
\caption{CHILDREN’S FEAR SURVEY SCHEDULE – DENTAL SUBSCALE (CFSS - DS): TOTAL MEAN VALUES, MEAN VALUES FOR CHILDREN WITHOUT DENTAL TRAUMA, WITH ISOLATED DENTAL TRAUMA AND REPEATED DENTAL TRAUMA INJURY DEPENDING ON AGE AND GENDER}
\begin{tabular}{|c|c|c|c|c|}
\hline
Groups & Age & Gender & CFSS-DS & Num. of Cases \\
\hline
\multirow{3}{*}{Children without DT} & 5–8 years & Male & 35.55 & 11 \\
& & Female & 29.79 & 19 \\
& & Total & 31.90 & 30 \\
& 9–12 years & Male & 25.83 & 12 \\
& & Female & 31.57 & 7 \\
& & Total & 27.95 & 19 \\
& Total & Male & 30.48 & 23 \\
& & Female & 30.27 & 26 \\
& & Total & 30.37 & 49 \\
\hline
\multirow{3}{*}{Children with isolated DT} & 5–8 years & Male & 26.90 & 10 \\
& & Female & 25.31 & 16 \\
& & Total & 25.92 & 26 \\
& 9–12 years & Male & 22.91 & 32 \\
& & Female & 24.82 & 11 \\
& & Total & 23.40 & 43 \\
& Total & Male & 23.86 & 42 \\
& & Female & 25.11 & 27 \\
& & Total & 24.35 & 69 \\
\hline
\multirow{3}{*}{Children with repeated DT} & 5–8 years & Male & 25.00 & 6 \\
& & Female & 41.50 & 2 \\
& & Total & 29.13 & 8 \\
& 9–12 years & Male & 20.47 & 17 \\
& & Female & 21.25 & 4 \\
& & Total & 20.62 & 21 \\
& Total & Male & 21.65 & 23 \\
& & Female & 28.00 & 6 \\
& & Total & 22.97 & 29 \\
\hline
Total & 5–8 years & Male & 30.00 & 27 \\
& & Female & 28.49 & 37 \\
& & Total & 29.13 & 64 \\
& 9–12 years & Male & 22.80 & 61 \\
& & Female & 26.32 & 22 \\
& & Total & 23.73 & 83 \\
& Total & Male & 25.01 & 88 \\
& & Female & 27.68 & 59 \\
& & Total & 26.08 & 147 \\
\hline
\end{tabular}
\textsuperscript{a} grand mean, DT – dental trauma injury
Being exposed to the most dreaded situation, such as dental trauma, in some children it can create an effective form of therapy. Though the first visit with the dentist upon the acute dental trauma might be rather stressful, children can learn how to cope with potentially stressful situations if they experience no harm during this first treatment. This “exposure treatment” known to represent the form of psychological therapy for the treatment of phobias, can explain less anxiety present in children with dental trauma.

The results of the CMFQ and CFSS-DS tests revealed more anxiety in younger children belonging to the 5–8 years old age group. Younger children cannot so easily cope with repeated dental injuries as the older ones, probably because they are not mature enough to suppress their fears. This statement was supported by the results obtained by correlation coefficients, which showed a significant interrelationship between age and CMFQ and CFSS – DS (p<0,05) respectively, in children with repeated dental trauma injuries. In children with no dental trauma experience, the interrelationship between age and CMFQ (p<0,01) revealed the influence of age on the level of manifested anxiety as well.

The structure of the CMFQ test represents a significant impact of not only dental, but also medical aspects which might contribute to higher dental anxiety, particu-
larly in younger children. The situations, such as the fear of the needle and puncturing or seeing blood, can by no means be considered as the most fear provoking.

This assumption is in accordance with some previous findings considering the needle as the most responsible fear provoking factor.24–29

As to gender, the analysis of variance proved no statistical difference in dental anxiety.

Data from the literature varies depending on the sample and the methods used. Many studies confirm that females have higher prevalence of dental fear than males,29–34 which is at the same time in contrast to the others who found higher anxiety levels in boys.35 But, some authors also found the equal fear level among girls and boys.12,36,37

Several studies have reported that dental fear seems to decrease with increasing age, which in children is related to the development of cognitive abilities and the change in the expression of their fear. Children may learn to control the way they express their fear as they grow older.33,38

According to the results of the socioeconomic status, children coming from the families whose values were higher, thus representing poorer social circumstances, have the most frequencies of dental trauma injuries. It might be explained by less care and attention the parents give to potential injuries of their children. The reason might be in lack of time the parents spend with their children or a higher number of children they have to take care about and raise. It can also be because of the parents’ lack of education regarding the importance of promoting oral health in their children.

The parents’ age, education and the level of dental anxiety did not influence children’s anxiety. And finally, the results of our study show no statistically significant difference in the mean scores of children’s and parental dental anxiety, which is in accordance with some studies38,39, but in the opposition to some others40,41.

Conclusion

This study represents original data regarding the anxiety level in relation to dental traumas in Croatian children. It proves that dental traumatic injuries, particularly in younger children, influences their anticipation of fear and affect future contacts with the dentists.
Nevertheless, the decrease in dental anxiety in children with isolated and repeated dental traumas can be explained due to the treatment of phobias. After being flooded with negative experiences, a child becomes either averse or numbed to them. If the dentist’s approach to a traumatized patient isn’t painful and the child anticipates no harm at a first visit following the acute trauma, the forthcoming contacts may represent a powerful therapy. In conclusion, it is important to introduce an indicated psychological approach and consider every possibility of a nonpainful treatment in paediatric dental patients, particularly those with dental trauma injuries.

REFERENCES


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STRUKTURNA ANALIZA DENTALNOG STRAHA U DJECI SA I BEZ OZLJEDA ZUBA

SAŽETAK

Cilj istraživanja bio je evaluirati dentalni strah u djece i sa i bez ozljeda zuba na slučajnom uzorku djece u Hrvatskoj (59 dječaka i 88 djevojčica). Djeca su ovisno o iskustvu ozljeda zuba bili podijeljeni u tri skupine. Također su bili podijeljeni u dvije dobro uspoređivne skupine: 5–8 i 9–12 godina. U istraživanja su bile uključene samo ozljede trajnih zuba. CFSS-DS, CDAS i CMFQ su se koristili za evaluaciju dentalne anksioznosti. CDAS i CMFQ su se koristili za evaluaciju dentalne anksioznosti te se izračunao ISP Hollingshead-ov Indeks Socijalnog Statusa. Prosječne vrijednosti CDAS, CFSS-DS i CMFQ su se koristile za evaluaciju dentalne anksioznosti.

REZULTATI


Izvještaji

Evaluacija dentalne anksioznosti u dječkom uzorku u Hrvatskoj bio je unapred u svrhu evaluacije socijalnog statusa. Prosječne vrijednosti CDAS, CFSS-DS i CMFQ su se koristile za evaluaciju dentalne anksioznosti u dječkom uzorku u Hrvatskoj. U dječkom uzorku Hrvatske (59 dječaka i 88 djevojčica) nije dokazana statistički značajna razlika glede spola ili socijalnog statusa.