Dental Health and Dental Care in Children with Cerebral Palsy

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ABSTRACT

The aim of this study was to determine a difference between children with cerebral palsy (CP) and healthy children, regarding health condition of teeth and oral tissues. Dysfunction of masticatory system, in children with CP, causes many problems with mastication. Nonfunctional mastication is related with the consumption of mushy food and decreased selfcleaning of occlusal and proximal surfaces. All that leads to higher incidence of dental caries. Comparing the DMFT/dft (decayed, missing, filled tooth) index, it is evident that there is no statistically significant difference in tooth morbidity between the group of healthy children and group of children with CP. The healthy children have statistically more teeth with fillings with respect to children with CP. Extractions are more common in children with CP. There is no statistically significant difference between those two groups regarding decayed teeth, one of components of DMFT index. Decayed components are more common than the extractions and fillings in both groups, which shows the insufficient curative care for all children in both groups. It can be concluded that there is a certain need of early beginning and a better organization of the preventive pediatric and dental care, in order to decrease the appearance of dental decay and increase the level of dental health, in this challenged population.

Key words: cerebral palsy, caries, masticatory units, DMFT/dft index

Introduction

The achievement of maintaining optimal oral health is a specific problem in a population of children with disabilities. Oral health is usually compromised because of other systemic health problems. Another reason of a decreased level of dental health is the children’s inability and parents motivation to perform adequate oral hygiene due to motoric or mental disfunctions.

Cerebral palsy (CP) is a chronic and no progressive disorder caused by the brain injuries, in an early stage of development. Usually the lesion is localized in the motoric part of cortex. Clinical manifestations of the disease change during the stages of growth and development. Children with CP develop certain motoric abilities but more slowly than healthy children. Some persons with severe CP are completely disabled and require lifelong care, while others display only slight awkwardness and need no special assistance. Complications associated with CP include learning disabilities, gastrointestinal dysfunction, tooth decay (dental caries), sensory deficits, and seizures. The four types of cerebral palsy include spastic cerebral palsy, ataxic cerebral palsy, athetoid cerebral palsy, and mixed cerebral palsy.

Inadequate function of masticatory system on children with CP causes problems with mastication and decreased selfcleaning. Constant consumption of mushy food related with disabilties in mastication, results in the more frequent appearance of dental caries. Hypersalivation, bruxism and oral breathing, also compromise the ability of maintaining adequate oral health. In children with CP, according to the literature, data related to the incidence of dental caries appears pretty inconsistent. Different studies show that children with CP have either lower, equal or higher caries prevalence, than the healthy children.
A possibility of a dentist to handle the child and to give it an appropriate dental care depends on grade of his disability. Normally, about 14% of children with CP are able to collaborate with dentists just as the majority of health children. In 53% of children there is the need for a special adaptation on dental treatment of a child and in the most cases is not possible to perform all the necessary dental procedures. Moreover, in 33% of children dental treatment is not possible without use of general anesthesia.

The aim of this study was to evaluate the difference in oral health and dental care, between the group of children with CP and healthy children.

**Subjects**

The study included 50 children with CP from the institutions that provide care for children with special needs. The institutions were: educational center from; primary school «Gornja Vežica» from; rehabilitation center «Fortica-Kraljevica», from and center for children and youth «Kraljevica – Oštro» from Kraljevica.

Criteria for participation in the study was the presence of cerebral palsy (CP). During the conduction of the study, seven children were excluded from the study because three of their parents didn’t agree to collaborate in the study, three of them were moved to other institutions, and one child died. The study was finally completed with 43 children. Clinical examination was performed on children between 7 to 16 years of age. The mean age was 14 years for girls, and 12 years for boys.

Control group included the same number of children chosen by corresponding age and sex to the examined group. The control group included children who were regular patients of the University Dental Clinic of School of Medicine in Rijeka, Croatia.

Prior to commencing the study, parents/tutors signed an informed consent for each child to approve of this voluntarily participation in the study.

The study protocol was previously approved by the Ethical Committee of the University Dental Clinic of School of Medicine in Rijeka, Croatia.

**Methods**

Demographic data from the questionnaires, were given to children’s parents or tutors.

Clinical examination and inspection of oral cavity were performed by using a dental mirror and a dental probe. The following facts were noted: number of teeth, number of decayed teeth (D), missing teeth (M) and filled teeth (F), grouped as DMFT index. Caries was registered as cavitation. An average DMFT index was used for morbidity of deciduous teeth (8). The analysis of DMFT index and a filled tooth (F-component) was used for counting the number of dental treatments and for evaluation of curative care of those two populations. A missing tooth (M) and a filled tooth (F-component) was used for evaluation of partial treatments during the complete dental treatment. A decayed tooth (D-component) showed the level of an untreated caries lesions.

**Statistical analysis**

Statistical analysis was done with personal computer using the program SPSS ver. 10 (SPSS Inc. Chicago, SAD). Informations were showed by median and range, and the comparison of numerical data was done by Mann-Witney U-test for two groups and Kruskal-Wallis test for three and more groups.

**Results**

Table 1. shows the differences in the DMFT index values for permanent teeth (Z=741.5; p=0.275) and dft index values for deciduous teeth (Z=806; p=0.327). There is no statistically significant difference between morbidity of teeth, neither in the group of healthy children nor, in the group of children with CP.

<table>
<thead>
<tr>
<th>CP</th>
<th>Healthy</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMFT 18.5 (0–27)</td>
<td>16 (4–26)</td>
<td>Z 741.50 p 0.275</td>
</tr>
<tr>
<td>dft 0 (0–13)</td>
<td>0 (0–20)</td>
<td>Z 806.00 p 0.327</td>
</tr>
</tbody>
</table>

From the Table 2. it is evident that there is a statistically significant difference in the frequency of extracted teeth (Z=744.00; p=0.010) and filled teeth (Z=455.50; p<0.001) between the groups of healthy children and children with CP. However, here were no statistically significant differences in these two groups, regarding other components of the DMFT and dft index.

<table>
<thead>
<tr>
<th>CP</th>
<th>Healthy</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 2 (0–12)</td>
<td>2 (0–12)</td>
<td>Z 826.00 p 0.490</td>
</tr>
<tr>
<td>M 1 (0–7)</td>
<td>0 (0–0)</td>
<td>Z 774.00 p 0.010</td>
</tr>
<tr>
<td>F 0 (0–12)</td>
<td>2 (0–5)</td>
<td>Z 455.50 p 0.000</td>
</tr>
<tr>
<td>f 0 (0–12)</td>
<td>0 (0–12)</td>
<td>Z 782.00 p 0.186</td>
</tr>
<tr>
<td>f 0 (0–2)</td>
<td>0 (0–2)</td>
<td>Z 901.50 p 0.976</td>
</tr>
</tbody>
</table>
Discussion

In children with CP, the main obstacle to achieve and to maintain the optimal oral health level, is neglect of that part of health care, due to problems present because of the primary diagnosis. Children with CP do not visit their dentist on time for control, it usually only happens when a toothache appears. Besides, oral health is also disturbed because of children’s mental or motoric disability. Disabilities compromise proper maintenance of their own oral hygiene.

Children’s altered function of masticatory system and an inadequate mobility of lips and tongue, contribute to appearance of caries. Data related to the frequency of dental caries in population of children with CP are very inconsistent, differing: from those with lower, equal and higher caries prevalence in comparison with the population of healthy children.

The study included 86 children in total: 43 children with CP and 43 healthy children from the control, matching group.

Statistical analysis showing the tooth morbidity showed that the average value of the DMFT index expressed by median value was 18.5, for children with CP and 16 for healthy children. The df/t index value was 0 (median), for both groups of children. Teeth morbidity was equal for healthy children. The dft index value was 0 (median), for children with CP and 16 by median value was 18.5, for children with CP and 16 by median value was 18.5, for children with CP and 16.

The component of untreated caries was more common in children with CP (Table 2).

Analysis of certain components of the DMFT/dft index showed that there was no statistically significant difference among the groups regarding untreated caries (D). The component of the missing teeth (M), was more common in children with CP (Table 2).

Analysis of the filled tooth (F-component) showed the appearance of treated teeth in the subjects.

Group of healthy children had statistically significant more fillings in permanent teeth than children with CP. The M and F component explained a clinical approach for the treatment of a decayed tooth. The results showed that in group of children with CP, the extractions were more frequent clinical choice, then in group of healthy children, in which prevailed the fillings as the treatment option for permanent teeth (Table 2).

In conclusion, a poor collaboration in disabled children usually doesn’t leave much space for a therapist in planning further dental treatments in the teeth which require complex restorations and/or root canal treatment. Unfortunately, most cases would therefore and up with extractions as a treatment choice. Kakavanaki shows that the 82% of interventions in children with disabilities are extractions, MacPherson14 represents that the 96% of cases of extractions are performed in general anesthesia and the 48% in local anesthesia, and Hosey15 presents an increasing trend in the number of extractions in the period of 13 years varying from 26% up to 74% of cases.

Similar problems, like the insufficient care and unsuccessful dental care for children with special needs, are presented by different authors and in many other countries.

Conclusions

1. The comparison of the DMFT/dft index showed that there was no difference in the number of decayed teeth in children with CP and health children.

2. The analysis of components of the DMFT index showed a statistically significant higher number of fillings in the group of healthy children with respect to children with CP. However, children with CP had more extractions.

3. The component of untreated caries was more common than extractions and fillings, which points out the unsuccessful curative care for all children and not only for those children with CP.

4. Therefore, a well organized pediatric and dental preventive care is imperative in preventing escalation of dental diseases, as well as in maintaining general health, in children with CP.
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ORALNO ZDRAVLJE I ZAŠTITA ZUBI DJECE SA CEREBRALNOM PARALIZOM

SAŽETAK

Svrha ovog istraživanja bila jest utvrđivanje različitosti oralnog i dentalnog zdravlja između zdrave djece i djece sa cerebralnom paralizom (CP). Disfunkcija mastikatornog sustava kod djece sa CP razlog je višestrukih problema tijekom života. Zbog disfunkcionalne mastikacije povezane je sa konzumacijom ljepljive hrane te sa manjkom samočišćenja okluzalnih i aproksimalnih ploha zubi. Sve navedeno vodi ka povećanoj incidenciji karijasa. Usporedbom DMFT/dft (decayed-kariozan, missing-nedostajući, ekstrahirani, filled-ispunjen, tooth-zub) indeksa, utvrđeno je da ne postoji statistički značajna razlika u morbiditetu zubi između skupine zdrave djece i skupine djece sa CP. U skupini zdrave djece utvrđeno je statistički značajno više zubi sa ispunima (F) u odnosu na skupinu djece sa CP. Ekstrahirani zubi (M) bili su više prisutni u skupini djece sa CP. Nije utvrđena statistički značajna razlika između skupina glede pojavnosti karioznih zubi (D), jedne od komponenti DMFT indeksa. Kariозni zubi su više prisutni od ekstrahiranih zubi u obje skupine, što ukazuje na nedostatnu saniranost zubi u primarnoj zaštitii, kod obje skupine djece. Zaključno se može utvrditi da postoji potreba za ranijom i bolje organiziranom preventivnom pedijatrijskom i dentalnom medicinskom zaštitom u namjeri da se smanji incidencija zubnog karijesa te poveća razina oralnog i dentalnog zdravlja u ovoj osjetljivoj populaciji djece.