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Dental Health and Dental Care in Children with Cerebral Palsy

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A B S T R A C T

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 tissuses. Disfunction of masticatory system, in children with CP, causes many problems with mastication. Nonfunctional mastication is related with the consumption of mushy food and decresed selfcleaning of occlusal and aproximal surfaces. All that leads to higher incidence of dental caries. Comparing the DMTF/dft (decayed, missing, filled tooth) index, it is evident that there is no statistically significant difference in a tooth morbidity between the group of healthy children and group of children with CP. The healthy children have statistically significant 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 origanization of the preventive pediatric and dental care, in order to decrease the apparence 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 achivement of maintaining optimal oral health is a specific problem in a population of children with dissabilities. Oral health is usually compromised because of other systemic health problems. Anotther reason of a decreased level of dental health is the childrens' inability and parents motivation to perform adequate oral hygiene due to motoric or mental disfunctions[1].

Cerebral palsy (CP) is a chronic and no progressive disorder caused by the brain injuries, in an early stage of development[2]. 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[3]. 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[1].

Inadequate function of masticatory sysrem on children with CP causes problems with mastication and decresed selfcleaning. Constant consumption of mushy food related with dissabilities in mastication, results in the more frequent apparence of dental caries. Hipersalivation, bruxism and oral breathing, also compromise the ability of maintaing adequate oral health[1,2]. 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[5,6].

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Apossibility of a dentist to handle the child and to give it an appropriate dental care depends on grade of his dissability. 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 addaptation on dental treatment of a child and in the most cases is not possible to perform all the neccessary dental procedures. Oreover, in 33% of children dental treatment is not possibile without use of general anesthesia[7].

The aim of this study was to evaluate the difference in oral health and dental care, betwen 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 choosen by corresponding age and sex to the eksamined group. The control group included children who were regular patiens of the University Dental Clinic of School of Medicine in Rijeka, Croatia.

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

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

Methods

Demografic data from the qustionaires, were given to children's parents or tutors.

Clinical examination and inspection of oral cavity were performed by using a dental miror 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 registrated as cavitation. An average DMFT index was used for permanent teeth and the average dft index was used for morbidity of decidous 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 fillled tooth (F-componenet) 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 df index values for decidous teeth ($Z=806$; $p=0.327$). There is no statistically significant difference betweeen morbidity of teeth, neither in the group of healthy children nor, in the group of children with CP.

TABLE 1
DIFFERENCES IN DMFT AND DFT INDEX VALUES

	CP	Healthy	Statistics	
Index	Median (interquartile range)	Median (interquartile range)	Z	P
DMFT	18.5 (0–27)	16 (4–26)	741.50	0.275
dft	0 (0–13)	0 (0–20)	806.00	0.327

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. Howeever, here were no statistically significant differences in these two groups, regarding other components of the DMFT and dft index.

TABLE 2
DIFFERENCE TESTING OF DMFT AND DFT INDEX COMPONENTS BETWEEN CHILDREN WITH CP AND HEALTHY CHILDREN

	CP	Healthy	Statistics	
Index component	Median (interquartile range)	Median (interquartile range)	Z	P
D	2 (0–12)	2 (0–12)	826.00	0.490
M	1 (0–7)	0 (0–0)	774.00	0.010
F	0 (0–12)	2 (0–5)	455.50	0.000
d	0 (0–12)	0 (0–12)	782.00	0.186
f	0 (0–2)	0 (0–2)	901.50	0.976

Discussion

In children with CP, the main obstacle to achive and to mantain 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 ussually only happens when a toothache appears. Besidews, oral haelth is also disturbed because of children's mental or motoric dissability. Dissabilities compromise proper mantainance of their own oral hygiene[1].

Children's altered function of masticatory system and an inadequate mobility of lips and tongue, contribute to apparence of caries[1,2]. Data related to the frequency of dental caries in population of children with CP are very inconsistent, differing: from those with lower[3], equal[1,4] and higher caries prevalence in comparision with the population of healthy children[5,6].

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 dft index value was 0 (median), for both groups of children. Teeth morbidity was equal for both groups of children (Table 1). According to the recent literature, Nilsen[3] showed lower caries prevalence in the population of children with Cp, in comparision with the population of healthy children, whereas Matsson and Bakarcic[1,4] presented equal, and Rodriges dos Santos, Guare and Dos Santos, higher prevalence results[5,6,9]. In our case, in which we have the equl morbidity of the teeth in both groups, we presumed that the children visiting institutions have better care than healthy children living at home with parents. The social health care system in ther comiunity of Primorsko-Goranska County and the sorounding area, has been well organized for past more than 20 years. Since birth, children with CP are properly registrated and constantly followed by the pediatric health service, especially children visiting institutions[10]. Children who participated in this study were most of their time are situated in the institutions most of their time. They were under the constant care and control which resulted in a better dental care, in comparision with the population of healthy children living at home with their own parents. Ussualy, parents poorly educated and badly motivited for performing and maintaining satisfactory dental care in their children[7]. Oral hygiene, which depends on an individual effort and motiviation as well as education of parents, seems to be the main predisposing factor in the development of dental caries[7,11,12].

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 apparence of treated teeth in the subjects.

Group of healthy children had statistically significant more fillings in permanent teeth then 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 prevalied the fillings as the treatment option for permanent teeth (Table 2).

In conclusion, a poor colaboration in disabled children ussually 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. Unfortunatelly, most cases would therefore and up with extractions as a treatment choice. Kakaounaki[13] shows that the 82% of intervations in children with disabilities are extractions, MacPherson[14] rapresents that the 96% of cases of extractions are performed in general anesthesia and the 48% in local anesthesia, and Hosey[15] presents an increasing trend in the number of extractions in the period of 13 years varying from 26% up to 74% of cases.

Similiar problems, like the insuficient care and unsuccesful dantal care for children with special needs, are presented by different autors and in many other countries[16–20].

Conclusions

1. The comparision 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 unsuccesful curative care for all children and not only for those children with CP.
4. Therefore, a well organized pediatric and dental preventive care is an 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 žvakanja. Disfunkcionalna mastikacija povezana je ia sa konzumacijom ljepljive hrane te sa manjkom samočišćenja okluzalnih i aproksimalnih ploha zubi. Sve navedeno vodi ka povećanoj incidenciji karijasa. Usporedbom DMTF/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 cerebralnom paralizom (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. Kariozni zubi su više prisutni od ekstrahiranih zubi u obje skupine, što ukazuje na nedostatnu saniranost zubi u primarnoj zaštiti, kod obje skupine djece. Zaključno se može utvrditi da postoji potreba za ranijom i bolje organiziranom preventivnom pedijatrijskom i dentalno medicinskom zaštitom u namjeri da se smanji incidencija zubnog karijesa te poveća razina oralnog i dentalnog zdravlja u ovoj osjetljivoj populaciji djece.