

# Dental Status as a Quality Control Health Care Parameter for Children with Disabilities

Danko Bakarčić<sup>1</sup>, Igor Prpić<sup>2</sup>, Nataša Ivančić-Jokić<sup>1</sup>, Iva Bilić<sup>3</sup>, Vlatka Lajnert<sup>4</sup> and Dino Buković<sup>5</sup>

<sup>1</sup> Department of Paediatric Dentistry, Dental School, School of Medicine, University of Rijeka, Rijeka, Croatia

<sup>2</sup> Department of Pediatrics, School of Medicine, University of Rijeka, Rijeka, Croatia

<sup>3</sup> School of Medicine, University of Rijeka, Rijeka, Croatia

<sup>4</sup> Department of Prosthetic Dentistry, Dental School, School of Medicine, University of Rijeka, Rijeka, Croatia

<sup>5</sup> Department of Prosthetic Dentistry, School of Dental Medicine, University of Zagreb, Zagreb, Croatia

## ABSTRACT

*The aim of this study was to determine the level of dental health condition in children with disabilities and to find out whether dental health status might be used as a quality control parameter regarding overall health care for disabled children. Disabled and healthy children from 3 to 17 years old were examined. There were 86 boys and 34 girls in each group. Dental health status was evaluated using the World Health Organization diagnostic criteria for decayed, missing and filled teeth. The relations between mean decayed, missing and filled teeth index for primary, mixed and permanent dentition showed no statistically significant differences among groups. Our results showed that disabled children have evenly level of dental caries as their healthy peers. One can conclude that organized health care for disabled children have positive influence on dental care, too. Furthermore, dental status as an indicator of dental care level might be used as a parameter for quality control regarding overall health care for disabled children.*

**Key words:** dental care, disabled, children, quality control, health care

## Introduction

The oral hygiene level and dental caries status are variable among disabled children<sup>1-4</sup>. These differences are mostly due to methodological issues, study sample, sample of the population and place or conditions of the examination<sup>5-8</sup>. Furthermore, significant variations stem from where the children reside<sup>9-11</sup>. It has been shown that disabled children who lived in institutions had better dental care than those who lived within their families<sup>4,9,10</sup>.

In Rijeka region, (Northern Adriatic region of Croatia, with a population of some 500 000 inhabitants, including surrounding area) health care for children with disabilities is systematically organized for more than 20 years. Disabled children are (systematically) followed up from infancy until late adolescence. Multidisciplinary approach, including aspects of early diagnosis and adequate therapy, education and assistance to the child and its family, is implied<sup>12</sup>.

Systematically organised health care for disabled children does not include dental health care. Therefore, we aimed to determine the dental health condition in chil-

dren with disabilities. Specific health care is an important aspect of disabled children's overall well being, whilst its weakest chain in line is shown to be dental care. Thus we were determined to find out if dental status as an indicator of dental care level might be used as a parameter for quality control regarding overall health care for disabled children.

## Materials and Methods

### Participants

Group of the disabled children has been compared to their healthy peers regarding the level of oral hygiene and dental caries status.

There were 120 children with disabilities, 86 boys and 34 girls. Majority of them suffered from cerebral palsy. Furthermore, children with mental retardation, Down syndrome and autism were also included, due to their mental impairment. Lack of cooperation and insufficient

data obtained led to exclusion of one child. Majority of the children lived within their families whilst, during the parents working hours, they were under the professional care of qualified personnel in day-care centres for disabled children. Children were from 3 to 17 years of age (mean age 10). The control group consisted of the 120 healthy children attending several public schools in Rijeka. The children were chosen to match the study group by age and gender and were examined in the same manner.

All participants were submitted to a clinical dental examination, with parents and/or caregivers informed consent. The research was reviewed and approved by Ethical Committee of the University of Rijeka, Faculty of Medicine.

Presence of clinical caries, performed extractions and the presence of fillings in all teeth were inspected. Caries was registered at cavitation level. Dental caries status was evaluated using the World Health Organization (WHO) caries diagnostic criteria for decayed, missing, and filled teeth (DMFT). The DMFT index (and *dmft* index for deciduous teeth) is one of the simplest and most commonly used indices in epidemiological surveys of dental caries. It quantifies dental health status based on the number of carious, missing and filled teeth<sup>13,14</sup>. The results were represented in two parts (for deciduous teeth and for permanent teeth) for both groups of examinees. This division is made due to specificity of the examined population and their dentition. The issue is that examined population are children with disabilities, their time of teeth eruption is usually altered and most of children have persistent deciduous and early erupted permanent teeth in age not corresponding to their physiological time of shedding and/or eruption<sup>15</sup>. Consequence of this in sta-

tistical analysis is that the population is widely extended and uneven.

### Statistical analysis

Student's t-test and analysis of variance or nonparametric (Kruskal-Wallis or Mann-Whitney) tests, where appropriate, were used to test significance of statistical differences among groups.

## Results

Table 1. Relationship between *mean DMFT* index scores in children with disabilities and healthy children.

The difference of *mean DMFT* index between group of disabled children and group of healthy children was shown in table 1.

There were no statistically significant differences between disabled and healthy children in mean *DMFT index* scores. Separate analysis of particular parameters of the DMFT index indicates the level of care since it shows ratio of treated versus untreated disease. It is clearly visible that statistically significant difference exists only in F parameter of DMFT score.

Table 2. Relationship between *mean dmft* index scores in children with disabilities and healthy children.

The difference of *mean dmft* index between group of disabled children and group of healthy children was shown in table 2.

There were no statistically significant differences between groups regarding *dmft* index scores but parameter f is significantly different.

**TABLE 1**  
RELATIONSHIP BETWEEN MEAN DMFT INDEKS SCORES IN CHILDREN WITH DISABILITIES AND HEALTHY CHILDREN

	with disabilities		healthy		df	t	p
	M	SD	M	SD			
DMFT index	2.78	3.95	3.29	3.50	239	-1.065	>0.05
D	2.03	3.30	1.41	2.00	239	1.751	>0.05
M	0.16	0.75	0.03	0.18	239	1.811	>0.05
F	0.58	1.57	1.80	2.61	239	-4.571	<0.01

D – decayed teeth, M – missing teeth, F – filled teeth

**TABLE 2**  
RELATIONSHIP BETWEEN MEAN DMFT INDEKS SCORES IN CHILDREN WITH DISABILITIES AND HEALTHY CHILDREN

	with disabilities		healthy		df	t	p
	M	SD	M	SD			
dft index	2.20	3.95	2.49	3.62	239	-0.599	>0.05
d	2.13	3.95	2.26	3.46	239	-0.277	>0.05
f	0.60	0.34	0.23	0.72	239	-2.214	<0.05

D – decayed teeth, M – missing teeth, F – filled teeth

## Discussion

Although there is a wide range of caries rates among people with disabilities, their overall rate is significantly higher than that of the general population.<sup>11</sup> However, obtained results in our study did not show statistically significant difference between the groups regarding dental morbidity status. The level of dental morbidity status for disabled children was high, but with no statistically significant difference compared to general population of children.

Separate analysis of specific parameters within dental morbidity index enable us to determine the level of dental care. Parameters D and d (decayed) correspond to the level of untreated disease, caries. Parameters F or f (filled) and M (missing) correspond to the level of treated disease and the type of dental treatment, filled or extracted tooth. In our study we had found statistically significant difference between the groups only regarding the status of filled teeth parameter. This finding suggests that, either, children with disabilities the dentist less frequently or dentists minimise performing the treatments due to the patients' lack of cooperation. Since the teeth extraction is preferred type of dental treatment in this population, parameter M (corresponds to the level of performed extractions) is slightly higher in children with disabilities<sup>12</sup>.

In our community health care for children with disabilities has been well organized for more than two decades. Since the period of infancy when the disabled children are registered as »children at risk«, they are followed up and constantly under the professional supervision. Specific health care, however, does not include planned dental care. Despite that, our results revealed that disabled children have evenly level of dental morbidity as healthy children. One can conclude that organized health care for disabled children have positive influence on dental care, as well. Furthermore, dental status might be

used as one parameter for quality control regarding overall health care for disabled children.

Disabled children in our study group were/are residents of day-care centres and it has been known that institutionalised children usually have better dental care than those who live within families<sup>6,9-11</sup>. However, dental health care is not a standard program of these centres. Our examinees are under constant supervision and care that includes both, general and oral hygiene measures.

We presume that frequent visits to paediatricians with additional education in paediatric neurology and developmental neurology improve overall well being and quality of life of disabled children. Parents are educated and regularly advised about their child's needs, including preventive dental care. The importance of such approach lies in a known fact that oral hygiene level, the most important factor of caries risk, depends of individual efforts including parental motivation and education regarding oral and dental health care<sup>2,3,7,16</sup>.

Both groups of studied children had high or very high caries prevalence according to WHO criteria. Values of dmft/DMFT indexes regarding general population, although some lower comparing to those of disabled children, were still very high. These results urge for general modification of dental service at the national level.

In general, dental care for children with disabilities is various, but commonly not adequately planned. The obligation of paediatrician is to evaluate the oral cavity and dental structures as a component of the total clinical status. Paediatricians should counsel parents/guardians and suggest them to visit paediatric dental practitioner as early as possible. An early coordinated teamwork between paediatricians and paediatric dental practitioners is particularly important in the cases of children with disabilities<sup>17-19</sup>. It is often the case that the paediatrician stands as »the gatekeeper« considering early oral health care evaluation and necessary preventive and rehabilitative services<sup>11</sup>.

## REFERENCES

1. DYSTER-AAS A, OSTLUND J, *Europ J Pediatr Dent*, 3 (2000) 118.
2. MAIWALD HJ, ENGELKENSMEIER B, *Zahn Mund Kieferheilkd Zentralbl*, 78 (1990) 11.
3. POPE JE, CURZON ME, *Pediatr Dent* 13 (1991) 156.
4. IVANCIC JOKIC N, MAJSTOROVIC M, BAKARČIĆ D, KATALINIC A, SZIROVICZA L, *Coll Antropol* 31 (2007) 321.
5. GULHAN A, AKINCI T, AYTEPE Z, *Europ J Pediatr Dent*, 3 (2000) 117.
6. KAWAGUCHI T, NAKASHIMA M, *Fukuoka Shika Daigaku Gakkai Zasshi*, 17 (1990) 13.
7. PALIN T, HAUSEN H, ALVESALO L, *Commun Dent Oral Epidemiol*, 10 (1982) 86.
8. RAO DB, HEDGE AM, MUNSHI AK, *J Indian Soc Pedodont Prev Dent*, 19 (2001) 67.
9. BUTTS JJ, *Public Health Dent*, 27 (1967) 195.
10. CUTRESS TW, BROWN RD, BARKER DS, *Commun Dent Oral Epidemiol*, 5 (1977) 78.
11. WALDMAN HB, PERLMAN SP, SWERDLOFF M, *Mental Retardation*, 1 (2001) 53.
12. COOLEY WC, AND COMMITTEE ON CHILDREN WITH DISABILITIES, *Pediatrics*, 114 (2004) 1106.
13. ANAISE JZ, *Commun Dent Oral Epidemiol*, 12 (1984) 43.
14. JANKOVIC B, CIGLAR I, KNEZEVIC A, JURIC H, BUKOVIC D, STANICIC T, *Coll Antropol* 28 (2004) 439.
15. KOCH G, POULSEN S, *Pediatric dentistry – a clinical approach* (Munksgaard, Copenhagen, 2001). 307–8.
16. COSTELLO PJ, *J IR Dent Assoc*, 36 (1990) 99.
17. SILVER EJ, STEIN REK, *Ambulat Pediatr*, 1 (2001) 314.
18. LULIC DUKIC O, JURIC H, DUKIC W, GLAVINA D, *Coll Antropol* 25 (2001) 297.
19. RAJIC Z, GVOZDANOVIC Z, RAJIC-MESTROVIC S, BAGIC I, *Coll Antropol* 24 (2000) 151.

D. Bakarčić

School of Medicine, Dental School, University of Rijeka, Knešimirova 40, 51000 Rijeka, Croatia  
e-mail: danko.bakaracic@ri.htnet.hr

## **DENTALNI STATUS KAO PARAMETAR KONTROLE KVALITETE BRIGE O ZDRAVLJU U DJECE S POTEŠKOĆAMA U RAZVOJU**

### **S A Ž E T A K**

Svrha ovog istraživanja bila je utvrditi stupanj stanja oralnog zdravlja u djece s poteškoćama u razvoju te otkriti kako status oralnog zdravlja može biti korišten kao parametar kontrole kvalitete glede brige o oralnom zdravlju u djece s poteškoćama u razvoju. U istraživanju su sudjelovala zdrava djeca i djeca s poteškoćama u razvoju u dobi od 3 do 17 godina. Bilo je 86 dječaka i 34 djevojčice u svakoj grupi. Dentalni status je bio evaluiran pomoću kriterija Svjetske zdravstvene organizacije za kariozne, ekstrahirane i plombirane zube. Odnos između karioznih, ekstrahiranih i plombiranih zuba za mlječnu, mješovitu i trajnu denticiju nije pokazao statistički značajnu razliku među grupama. Naši rezultati pokazuju da djeca s poteškoćama u razvoju imaju razmjerni stupanj dentalnog karijesa kao i njihovi zdravi vršnjaci. Može se zaključiti da organizirana briga o zdravlju za djecu s poteškoćama u razvoju ima pozitivan učinak i na brigu o oralnom zdravlju. Štoviše, dentalni status kao pokazatelj stupnja brige o oralnom zdravlju može biti parametar kvalitete glede cjelokupne brige o zdravlju u djece s poteškoćama u razvoju.