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Original scientific paper

Dental Caries in Disabled Children

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A B S T R A C T

The aim of the study was to evaluate oral health conditions and dental caries status in disabled and healthy children. Two groups of randomly selected children 3–17 years old were examined. The first group comprised 80 children with disabilities (cerebral palsy, mental retardation, Down syndrome, autism and hearing-speaking disorders) and the second (control) group included 80 healthy children. Examined children were selected from several institutions which take care of disabled persons, kindergardens and four elementary schools. Clinical examination was performed by using a mirror and a probe and revealed the presence of dental caries, missing (extracted) and filled teeth. All clinically detected cavitations were registered as dental caries. The degree of oral hygiene was evaluated according to the OHI-S index values, which was determined by marking the plaque with 1% eozine solution. The values of OHI-S index ranged from 3.8–4.53 in disabled children and 2.73–2.84 in healthy children. In disabled children, the average dft values were 3.42 in deciduous teeth and 5.24 in mixed dentition. In healthy children, the average dft values were 1.43 in deciduous teeth and 5.1 in mixed dentition. The average DMFT index in disabled children was 1.41 for mixed and 6.39 for permanent dentitions. In healthy children, the average DMFT values were 1.23 in mixed and 4.76 in permanent dentitions. In general, the results revealed significantly poor level of oral hygiene and quite high level of caries prevalence in both disabled and healthy children, accentuating the need to reorganize preventive care measurments and improve dental care, particularly in disabled children in Croatia.

***Key words**: oral health, disabled children, dental caries, DMFT/dft index*

Introduction

Children with disabilities, having serious psychological, physical and intellectual problems, should obtain special preventive care in dental office[1]. Consequently, inadequate dental care or poor dental public health measurments may have negative influence on the oral health status. Because of the insuficient or sometimes complete disfunction of their stomatognathic apparatus, often due to anatomical malformations of the orofacial cavity and children's uncooperative behaviour, accomplishment of good oral hygiene measurments usually implies the assistance of parents or caretakers[2]. The most important risk factor for dental caries in disabled children is due to poor oral hygiene and inadequate tooth brushing. Preventive measurments should thereby include adequate education and motivation both for patients and their caretakers, finally aiming at obtaining and maintaining satisfactory oral hygiene throughout the lifespan[3,4].

Materials and Methods

Clinical examination was performed on a randomly selected sample of 160 healthy and disabled children from the Centar for Rehabilitation »Slava Raškaj« Rijeka, the Centar for Autism Zagreb – Subsidiary Rijeka, the Centar for Pedagogics and Education Rijeka, kindergardens of the Preschool Organisation »Dječji vrtić Rijeka«, four elementary schools (»Bakar«, »Hreljin«, »Brešca«, »Matulji«) and the Public Dental Health Offices in Rijeka. For the purpose of the study, examinees were divided in to two groups: the first group comprising 80 children with disabilities (cerebral palsy, mental retardation, Down syndrome, autism and hearing – speaking disorders) and the second control group comprising 80 healthy children. Children were 3 to 17 years old. Clinical examination was performed by using a probe and a mirror and included registration of clinically present caries lesions, extractions and the number of fillings.

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The OHI – index (oral hygiene index) was used for the evaluation of the degree of oral hygiene conditions. For that purpose, teeth of each child in the examined groups were treated with 1% eozin alcohol solution. Teeth were first separated in six groups (3 in maxilla and 3 in mandible). After having them marked by using a plaque marker (1% eosin alcohol solution), the degree of oral hygiene was evaluated by revealing vestibular and oral coloured surfaces. The most coloured surfaces in each of six groups of teeth in a patient's mouth were evaluated from 0–3 and the values were registered in the patient's chart. The OHI index for each patient was calculated by dividing the total sum with the number of groups (6)[5,6].

Clinically detected cavitations were registered as active carious lesions. For the purpose of evaluating the prevalence and the intensity of carious lesions in both dentitions and revealing every possible morbidity (caries, extractions, fillings), Klein-Palmers index (DMFT index) was used.[7,8] Representing the average number of cariously affected and dentally treated teeth in the population, DMFT index revealed decayed, missing and filled teeth in the permanent dentitio. The dft index was used for the same purpose in deciduous teeth (d = decay in deciduous teeth; D = decay in permanent teeth), extractions (M = missing tooth in permanent dentition) and fillings (f = filling in deciduous tooth; F = filling in permanent tooth).

The prevalence of caries was established and presented as percentage of the population affected by caries.

The data was registered in a special questionnare designed for the purpose of the study. Parents and/or caretakers of the examined children were obliged to sign the informed consent and if necessary, the approval from the Institution for Disabled Children was taken. For the purpose of statistical analysis, the data was performed in »Excel 5.0/7.0» Microsoft program, and converted to the SPSS statistical program version 10 (SPSS Inc. Chicago, USA).

Results

Figure 1 representing the average OHI-index values show that there is a statistically significant difference in the quality of oral hygiene between deciduous ($p=0.033$), mixed ($p<0.001$) and permanent dentitions ($p<0.001$), in both control and examined groups of children.

Comparing the results of the average dft index values presented in Figure 2, there is no statistically significant difference between the examined gropus, i.e. there is no significant difference between deciduous and mixed dentitions in healthy and mentally handicapped children.

Comparing the results of the average DMFT values obtained for mixed dentition, there is no statistically significant difference between disabled and healthy children. (Figure 3) According to the results, there is no statistically significant difference in the average DMFT values obtained for permanent dentition in disabled and healthy children either.

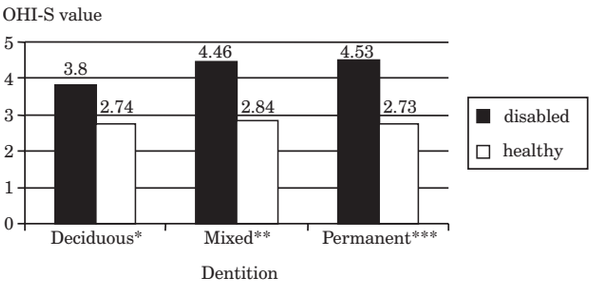

Fig. 1. The relationship representing the average OHI-S index values in deciduous, mixed and permanent dentitions in healthy and mentally handicapped children. (p=0.033, p<0.01**, p<0.001***, OHI-S value = Oral Hygiene Index – Simplified)*

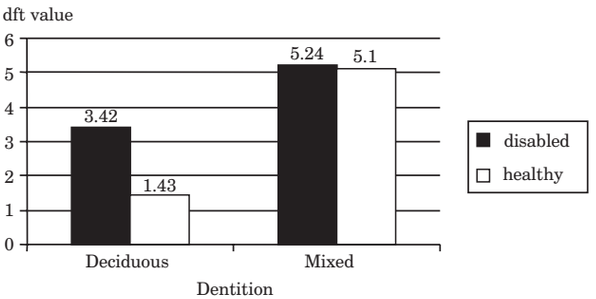

Fig. 2. The relationship representing the average values of dft index in deciduous and mixed dentitions in healthy and mentally handicapped children. (p(deciduous, mixed) – no statistically significant difference, dft index – decayed, filled teeth (deciduous teeth)

The results representing the percentage of examined children with caries in deciduous, mixed and permanent dentitions, show that the caries frequency in disabled and healthy children is statistically significant only in comparison to the results obtained for deciduous dentition ($p=0.047$). (Figure 4)

Discussion

There is a statistically significant difference in the quality of oral hygiene in deciduous ($p=0.033$), mixed ($p<0.001$) and permanent dentitions ($p<0.001$), between the control and the examined groups of children. (Figure 1)

The OHI-S index for disabled children ranges from 3.8 to 4.53 indicating poor oral hygiene in comparison with healthy children, whose OHI-S index ranges from 2.73 to 2.84. The results are in accordance with some recent epidemiological findings, implying a possibility of not using fluoride dentifrices as indicated[9–11].

Comparing the results of the average dft index values presented in Figure 2, there is no statistically significant difference between the groups in deciduous and mixed dentitions.

The average dft index in disabled children is 3.42 for deciduos and 5.24 for mixed dentition, whereas in healthy children, the average dft index for deciduous dentition is 1.43 and 5.1 for mixed dentition.

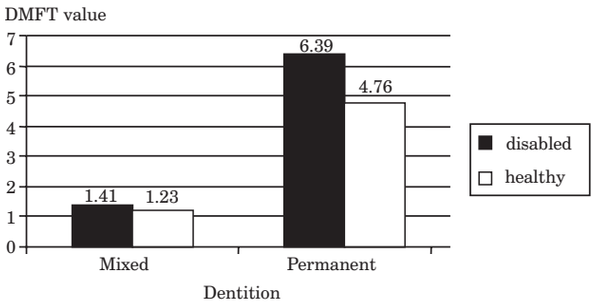

Fig. 3 The relationship representing the average values of DMFT index in mixed and permanent dentitions in healthy and mentally handicapped children (p(mixed, permanent) – no statistically significant differenc, DMFT Index – Decayed, Missing, Filled Teeth).

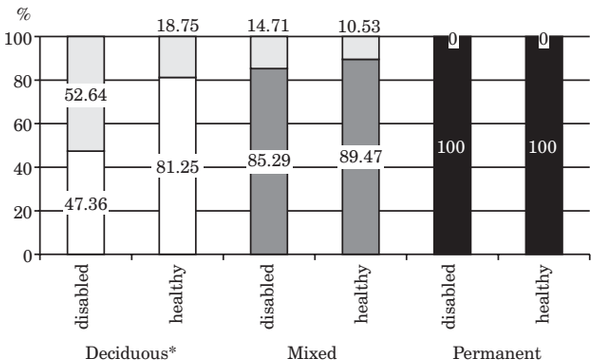

*Fig. 4. The relationship representing KIO index in deciduous, mixed and permanent dentitions in healthy and mentally handicapped children. (*p=0.047, KIO index – caries frequency).*

The results of this study reveal a lower dft index value in comparison with the findings of Rao et al., whose scores were 3.06 for deciduous dentition.[12]

On the contrary, the same results represent a higher value for mixed dentition, which was 3.32 according to the same authors.[12]

In the recent literature, some authors represented different dft index values for deciduous dentition, such as Dyster-Aas et al. (2.34), Gibson et al. (4,85) and Lulic-Dukic et al. (5.2)[13–15]. Alvarez-Arenal et al. showed a lower dft index value in deciduous (2.10) and mixed (2.38) dentitions[16].

Comparing the results of the average DMFT values obtained in mixed dentitions, there is no statistically significant difference between disabled (1.41) and healthy (1.23) children. (Fig. 3) Furthermore, there is no statistically significant difference in the average DMFT values obtained for permanent dentitions in disabled (6.39) and healthy (DMFT = 4.76) children either. (Fig. 3)

The results published by Rao et al., both referring to mixed (1.41) and permanent (4.51) dentitions, are comparable with the results obtained in this study[12].

The average results referring to mixed dentition in healthy children, given by Dyster-Aas et al. (0.33), do not differ significantly from the results obtained in this study either[13].

Alvarez-Arenal et al. found that the average DMFT values for permanent teeth in healthy children were 3.30, whereas the results of Kawaguchi (7.45), Bjarnason (8.1) and Jankovic (9.0) showed that the intensity of caries in the permanent teeth in healthy children was significantly higher in comparison to the results represented in this study[8,9,16,17].

Comparing the average DMFT values in deciduos (1.41) and permanent (6.39) dentitions, there is an increase in the intensity of caries. Children in the age of six are more independent in brushing their teeth. Due to their psycholgical and phisycal impairment, as well as ineadequate oral hygiene mesurments, they might consequently be at risk for a higher intensity of caries. According to the World Health Organization, more than 60% of the European countries have achieved the goal of the maximum DMFT value (3) in the age of 12 years. Others, including the independent Baltic States, still have high caries levels[11].

The percentage of the examined children with caries in deciduous, mixed and permanent dentitions, represent a statistically significant value referring to the intensity of caries in both disabled and healthy children only for deciduos dentition (p=0.047) (Figure 4).

The results of this study reveal no statistically significant difference in the caries prevalence in deciduous, mixed or permanent dentitions between the examined groups. These findings are in accordance with the results of Declerck et al., who found no statistically significant difference regarding the caries prevalence between disabled and healthy children either[18,19]. The same conclusions regarding the caries prevalence were presented in the results obtained by Maiwald et al., Palin et al. and Pope et al. Al-Qahtani[10,19–21].

Due to a higher intensity of caries in deciduous teeth of healthy children, the results show that the percentage of caries in primary dentition (18.75) is higher than in the mixed dentition (10.53). (Figure 4)

The mean values for decays, extractions and fillings were high in both dentitions. The index referring to the quality of a dental treatment was low and unsatisfactory, especially in deciduous teeth. Preventive measurements in handicapped children need to be intensified by stimulating parents to become aware of the need for early prevention and a possible treatment of the teeth in children with systemic diseases[22].

Referring to the recent findings, the prevalence of caries in children with special needs was very high and the number of children with good oral hygiene status was very low[10].

Furthermore, caries in first permanent molars, as well as bad habits and malocclusions, were more common in children with disabilities than in healthy children[23].

Both paediatricians and/or paediatric dentists should aim at improving dental health care in children and their parents.

Some authors confirmed that effective oral health programmes commencing well before the usual first contact with dental services in the age of 5 are needed for young children who are at high risk of dental caries[25].

Conclusion

According to the present results, significantly low level of oral hygiene status and a high level of the caries prevalence is found in both disabled and healthy children. It leads to conclusion that preventive care is still not satisfactory in the Croatian population and dental care, especially in disabled children, isn't adequately organized in the country. Further changes are mandatory in order to improve preventive measurments and promote oral health particularly in children with systemic diseases.

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KARIJES U DJECE S POTEŠKOĆAMA U RAZVOJU

SAŽETAK

Cilj ovog rada je procjena zdravstvenog stanja usne šupljine i zubnog statusa u djece s poteškoćama u razvoju i zdrave djece. U ovom istraživanju pregledane su dvije grupe djece u dobi od 3–17 godina starosti. Prvu grupu sačinjavalo je 80 djece s poteškoćama u razvoju (cerebralna paraliza, mentalna retardacija, Down sindrom, autizam i slušno-govorni poremećaj), a drugu kontrolnu skupinu 80 zdrave djece iste dobi. Ispitanici su polaznici nekoliko institucija koje brinu o djeci s posebnim potrebama, dječjih vrtića i četiri osnovne škole. Klinički pregled je izvršen upotrebom stomatološkog ogledala i sonde, a bilježeni su podaci o karijesu, izvršenim ekstrakcijama i izrađenim ispunima. Karijes je registriran na nivou kavitacije. Stupanj oralne higijene određen je pomoću OHI-S indeksa, koji je određen bojanjem plaka 1% otopinom eozina. Vrijednosti OHI-S indeksa bile su u rasponu od 3,80 do 4,53 u djece s poteškoćama u razvoju i od 2,73 do 2,84 u zdrave djece. U djece s poteškoćama u razvoju prosječna vrijednost kp indeksa bila je 3,42 u mliječnoj i 5,24 u mješovitoj denticiji. U zdrave djece te vrijednosti bile su 1,43 za mliječnu i 5,10 za mješovitu denticiju. Prosječna vrijednost KEP indeksa u djece s poteškoćama u razvoju bila je 1,41 za mješovitu i 6,39 za trajnu denticiju. U zdrave djece te vrijednosti bile su 1,23 za mješovitu i 4,76 za trajnu denticiju. Rezultati nisu pokazali statistički značajnu razliku u intenzitetu karijesa između istraživanih skupina. Djeca s poteškoćama u razvoju imala su značajnije lošiji nivo oralne higijene u usporedbi sa zdravom djecom.