Status of the Oral Health by the Seventh Grade Students in the Bosnian-Podrinje Canton

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Original paper
SUMMARY
Introduction: As documented information about the oral health status for children of Bosnian Podrinje canton Gorazde does not exist, there was a need for an assessment of oral health status in this region for the creation of preventive programme, whose purpose would be a reduction of incidence of dental caries, periodontal conditions, as well as orthodontic anomalies in the future. The purpose of this work is to show the prevalence of dental caries, periodontal conditions and the presence of orthodontic anomalies in the seventh grade students in the Bosnian-Podrinje Canton. Examinees and working methods: In three municipalities of the Bosnian-Podrinje Canton, 358 students born in 1997 and 1998 have been examined during 2010. Parameters used to establish the status of the oral health were the following indexes: DMFT, SiC, CPI and DAI-index for registering orthodontic irregularities. One dentist examined all the examinees in accordance with the methodology and criteria set by the World Health Organization, i.e. a regular dentist mirror and standard periodontal probe have been used in daylight avoiding direct sun light. Results: average DMFT value in the seventh grade children was 5.84 ± 3.929, SiC index was 10.34 ± 3.028, whereas the caries prevalence was 96.09%. 45.5% examinees had healthy periodontal conditions. Average DAI-index value was 25.25. Conclusion: the status of the oral health in the seventh grade children in the Bosnian-Podrinje Canton is very poor. Prevention programmes and oral health promotion are necessary.
Key words: oral health, DMF index, CPI index, DAI index, Bosnian-Podrinje Canton.

1. INTRODUCTION

Bosnian-Podrinje Canton is situated in Eastern B&H with the total area of 604.6 square km (1). It consists of three municipalities: Gorazde with the capital Gorazde, Pale-Praca with the capital Praca and Foca-Ustikolina with the capital Ustikolina. Center of the Canton is in Gorazde. The total population according to the data as of June 30, 2008, is 33,225 residents (2), and 14.23%(2) of the total population are children younger than 14 years of age.

Results of the regular check-ups conducted every year for the seventh grade children showed that the state of oral health in the area of Bosnian-Podrinje Canton is very poor.

As documented information about the oral health status for children of Bosnian Podrinje canton Gorazde does not exist, there was a need for assessment of oral health status in this region for creation of preventive programme, whose purpose would be a reduction of incidence of dental caries, periodontal conditions, as well as orthodontic anomalies in the future.

2. EXAMINEES AND WORKING METHODS

This research was conducted in the primary schools in the area of Bosnian-Podrinje Canton in the period between September 2009 and March 2010. Average epidemiology study (cross-sectional study) was applied.

All 358 children from the seventh grades of the primary schools in the region participated in this research - 194 boys and 164 girls participated in this research.

Estimation of the oral health:

Examinations of the students were done in the classrooms with the same approach for each examinee (4). All examinations have been done in daylight avoiding direct sun light and without prior announcements to the students (3). All the data established during the examinations have been registered in the dental records suggested by the World Health Organization (4) for the estimation of the oral health. Data registered in this dental record have been acquired based on the objective examination done by same dentist that had previously been calibrated for conducting planned research.

Twenty (20) children who were not involved in the actual sample have been the pattern for calibration. Second examination of the children from the sample was done seven days after the first examination. The dentists' reliability was tested through kappa statistics (4, 5). The kappa values estimated from repeat examinations for the intra-consistency of the fieldwork investigator was kappa = 0.93. Clinical ex-

amination of the students covered:

- dental status (DMF - index, SiC - index);
- periodontal tissues examination (CPI-index);
- orthodontic irregularities registration (DAI-index).

2.1. DMF index

In determining the dental status, a visual and touch method was used to detect caries by using the dentist mirror and standard CPITN periodontal probe.

The letters were used to mark primary teeth and numbers to mark permanent teeth as per the codes presented below (Chart 1).

A basic criterion for tooth presence is the existence of at least one visible surface of the examined tooth. In case both primary and permanent tooth are present at the same place only the presence of the permanent tooth has been registered (12).

DMF index value has been calculated as D(1+2)+M(3)+F(4).

2.2. CPI-index

Status of the periodontal tissue is registered with the CPI index according to the recommendations set by the World Health Organization for the examinees younger than 15 years of age (6). A specially designed lightweight CPI probe with a 0.5-mm ball tip is used, with a black band between 3.5 and 5.5 mm and rings at 8.5 and 11.5 mm from the ball tip .

The mouth is divided into sextants defined by tooth numbers: 18-14, 13-23, 24-28, 38-34, 33-43, and 44-48. A sextant should be examined only if there are two or more teeth present and not indicated for extraction. Probing with the periodontal probe was done on the index teeth 16, 11, 26, 36, 31, 46. In case where one of the index teeth was missing, the examination of the remaining teeth in the sextant was done and the worst results were taken. Results were registered as follows:

0 – healthy;

1 – Bleeding observed, directly or by using mouth mirror, after probing;

2 – Calculus detected during probing;

X – Excluded sextant (less than two teeth present).

Codes for primary teeth	Codes for permanent teeth	Tooth status
A	0	Sound, healthy
B	1	Decayed
C	2	Filled, with decay
D	3	Filled, no decay
E	4	Missing, as a result of caries
	5	Missing, any other reason
F	6	Fissure sealant
	7	Bridge abutment, special crown or veneer/implant
	8	Unerupted tooth
T	T	Trauma (fracture)
	9	Not recorded

Table 1. Codes for determining of dental status

2.3. DAI index

Dental Aesthetic index (DAI)(7) for determining dentofacial anomalies was used in the research. DAI is an orthodontic index that links clinical and aesthetic components mathematically to produce a single score.

Compared with other indices, the DAI is simpler and economical in terms of time (8, 9). The DAI outlines criteria for the assessment of dentofacial anomalies including missing teeth, crowding, spacing, diastema, overjet, reverse overjet, open bite and molar relationship. Structure and numerical values of dentofacial anomalies are shown in the table below (Table 2).

Determining of orthodontic treatment needs of students according Dental Aesthetic Index are shown in the table below (Table 3).

DAI component	Value
Missing teeth in upper jaw	6
Missing teeth in lower jaw /	6
Crowding (incisal segments)	2
Spacing (incisal segments)	1
Midline diastema (mm)	3
Anterior maxillary irregularity (mm)	1
Anterior mandibular irregularity (mm)	1
Overjet (mm)	2
Reversed overjet (mm)	4
Open-bite (mm)	4
Molar relationship: 0–normal 1–one-half cusp 2–one full cusp	x 3
+ 13 Standarsd constant = Total DAI score	

DAI score	Severity levels	Orthodontic treatment needs
13 – 25	Normal or minor malocclusion;	No treatment need or slight need
26 – 31	Definite malocclusion	Treatment elective
32 -35	Severe malocclusion;	Treatment highly desirable
< 36	Very severe (handicapping) malocclusion;	Treatment mandatory

Table 3. Distribution of DAI scores and orthodontic treatment needs

2.4. Statistical analysis

The research results were processed with the following statistical analysis methods: percentages, arithmetic mean value, standard deviation and Hi–square test.

3. RESULTS

3.1. DMF index

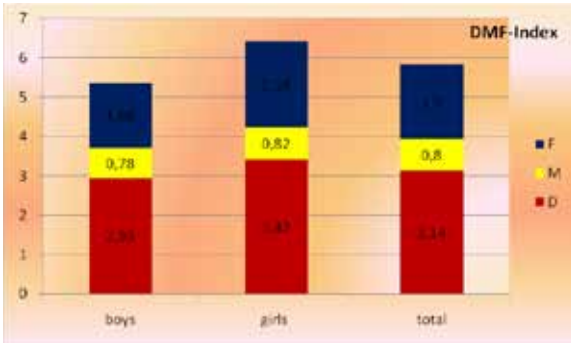
Caries prevalence in the seventh grade children in the Bosnian-Podrinje Canton Gorazde was 96.09%. Average DMF index value was 5.84 with standard deviation (SD) ±3.929. A significant difference between genders was determined (c2= 10.860 p = 0.001), with the average DMF index value for boys at 5.42 (SD ±3.557), and girls at 6.35 (SD ±4.259). The major part of the DMF index in the seventh grade students was the D component (53.94%), followed by filled teeth (32.53%) with the smallest percentage being extracted teeth (13.53%).

Among examined seventh grade students only 4 students (1.12%) had at least one tooth with a fissure sealant.

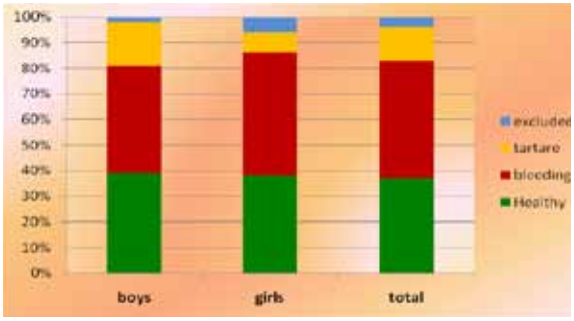
Subgroup for determining the SiC index consisted of 120 children (the top one third of the DMFT frequency distribution). SiC index for the seventh grade students in the Bosnian-Podrinje Canton Gorazde was **10.34** (SD ±3.028).

DAI components	Frequency	Boys	Girls	Total
Missing teeth	29	8.76%	7.32%	8.10%
Crowding (incisal segments)	136	36.08%	40.24%	37.99%
Spacing (incisal segments)	56	21.13%	9.15%	15.64%
Midline diastema (mm)	91	28.35%	21.95%	25.42%
Anterior maxillary irregularity (mm)	136	41.24%	34.15%	37.99%
Anterior mandibular irregularity (mm)	79	24.74%	18.90%	22.07%
Overjet (mm)	123	32.99%	35.98%	34.36%
Reversed overjet (mm)	57	18.56%	12.80%	15.92%
Open-bite (mm)	26	7.22%	7.32%	7.26%
Molar relationship:				
normal	218	58.76%	63.41%	60.89%
one-half cusp	96	27.32%	26.22%	26.82%
one full cusp	44	13.92%	10.37%	12.29%

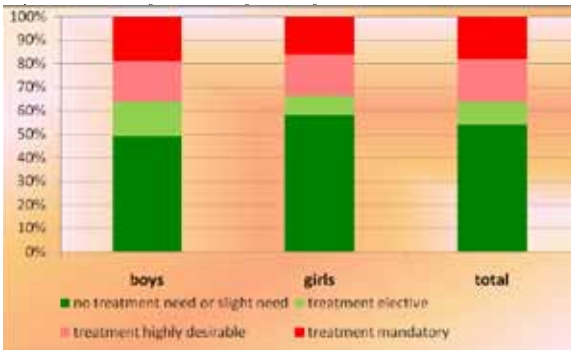
Table 4. DAI components



Graph 1. DMF index



Graph 2. Periodontal conditions for students according to highest Cpi score per person



Graph 4. Need for treatment of the dentofacial anomalies

3.2. CPI index

Prevalence of the periodontal diseases in the Bosnian-Podrinje Canton in the seventh grade students was 57.77%. On the average, every seventh grade student had 1.28 (SD ±1.360) of sextants with bleedings and 0.20 (SD ±0.722) sextants with calculus. 12.84% of students had at least one sextant with calculus.

3.3. DAI index

Prevalence of orthodontic anomalies in the seventh grade students in the Bosnian-Podrinje Canton Gorazde is 60.44%. Incidence of the dentofacial anomalies is a bit higher for boys (61.86%) than for girls (58.54%).

DAI component scores are shown in the table below (Table 4)

Abscence of anterior teeth with aesthetic impairment in the incisal segment was found frequently. In most cases teeth were extracted due to the caries, whereas for 4 students it was possibly the result of hypodontia (1.11%).

More than half of the students can be found in DAI grade 1 (54,34%) i.e., a minor malocclusion or no anomaly, with no need or slight need for orthodontic therapy. The distribution and percentage of students with each DAI grade are shown in Graph 4.

Graph above shows that 29.61% of children need orthodontic therapy in the nearest future.

The mean DAI-index value was 25.25 with value for boys at 25.71 (SD ±8.755), whereas for girls at 24.70 (SD ±8.784).

4. DISCUSSION

DMF-index values for the seventh grade students in the area of the Bosnian-Podrinje Canton is 5.84, and the caries prevalence is 96.09%. These values do not differ much from the values in Vrbic's study conducted in 1986 where it was determined that the DMF-index was 6.3 (10). Hatibovic S. established in 1987 that the average DMF-index in the 12-year-olds in Bosnia and Herzegovina was 6.15 (11). Ivankovic in the research from 2003 determined the DMF-index value of 6.2 with the cavity prevalence of 94%[(12). In 2000 Sulejmanagic H. concluded that the DMF-index in the 12-years-olds in Bosnia and Herzegovina was 6.10 (13). A bit better state of the oral health was discovered in 2008 by Muratbegovic A. in the research conducted in the whole area of Bosnia and Herzegovina where the registered DMF-index values in the B&H area for the 12-years-olds was 4.16 and the prevalence of the affected teeth was 91% (14).

Poorer values of the DMF-index of 7.9 and caries prevalence of 98.25% were registered in Montenegro, and much better values were registered in Italy: DMF-index 1.09 and caries prevalence 43.1% (15, 16). In the 12-years-old children in Portugal DMF-index was 1.5 and caries prevalence was 52.9% (17).

Determination of the CPI-index was in accordance with the World Health Organization's guidelines for children younger than 15 years of age (6). 195 (54,50%) students had at least one sextant showing the signs of gingivits or calculus which is quite alarming. On the average every student had **1.28** sextants with bleeding and **0.20** sextants with the calculus presence. 46 students had at least one sextant with the calculus (12.84%).

In Italy 47.5% of the 12-year-olds has CPI-0, i.e. no signs of periodontal diseases (16). Bleeding is present with 23.8% of the examinees, and

calculus has been found in 28.7% cases. In Portugal every 12-year-old on the average has 2.4 healthy sextants, 0.9 sextants with the presence of bleeding and 1.8 sextants with calculus (17). Also, 80% of 12-year-olds in Germany has healthy periodontal tissue, 10.8% has gingival bleeding and 9.2% of students has been registered with the presence of calculus (18).

Average DAI-index value in the seventh grade students in the Bosnian-Podrinje Canton was **25.25**. This value is lower than the DAI-index value that was registered in the USA for the younger age group (7-12 years) (DAI-index 26.5-31.8), adolescents from Japan (DAI-index 30.5), 13-year-olds from South Australia (DAI-index 28.1). However, this value is higher than DAI-index for the Nigerian children between the ages of 12 and 18 (DAI-index 22.3) and children between the ages of 12 and 15 in Iran (DAI-index 23.5) (19, 20, 21, 22, 23). It is similar to the values determined in the research of the Spanish adolescents (DAI-index 25.6), children between the ages of 12 and 13 in Poland (DAI-index 24.5), children between the ages of 12 and 15 in Australia (DAI-index 24.1) and children between the ages of 12 and 13 in Malaysia (DAI-index 24.8) (24, 25, 26). Twelve-year olds from the federal province of Sachsen-Anhalt in Germany have the average DAI-index of 24.34. The percentage of children in the need for orthodontic therapy was 24% (25). The leading reasons for such poor oral health are: lack of prevention programmes for the whole population, lack of experts who would be working with the children, non-existence of the pre-school clinics, poor economic state in the Bosnian-Podrinje Canton, and poor oral-hygiene habits.

5. CONCLUSION

Since the state of oral health in the area of the Bosnian-Podrinje Canton is quite poor, it is essential to put into practice a prevention programme for the children of up to 15 years of age as soon as possible. All healthcare and education sectors should be included in prevention of the oral diseases and risk-factors for the occurrence of oral diseases. Wider usage of the means of public communication should be put into use aimed at increasing and strengthening the individual awareness on the importance of oral health.

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