

# Health Condition of First Permanent Molars in Year 1977 and 2007 in Children in Istria (Croatia)

Izak Legović<sup>1</sup>, Ana Kotarac-Knežević<sup>2</sup>, Tomislav Čabov<sup>3</sup>, Gordana Brumini<sup>4</sup>, Anja Sasso<sup>5</sup>, Zoran Kovač<sup>6</sup>, Danko Bakarčić<sup>7</sup> and Vlatka Lajnert<sup>6</sup>

<sup>1</sup> School of Medicine, Rijeka University, Rijeka, Croatia

<sup>2</sup> Department of Oral Surgery, School of Dental Medicine, Zagreb University, Zagreb, Croatia

<sup>3</sup> Department of Oral and Maxillofacial Surgery, School of Medicine, Rijeka University, Rijeka, Croatia

<sup>4</sup> Department of Computer Science, School of Medicine, Rijeka University, Rijeka, Croatia

<sup>5</sup> Department of Endodontics, School of Medicine, Rijeka University, Rijeka, Croatia

<sup>6</sup> Department of Prosthodontics, School of Medicine, Rijeka University, Rijeka, Croatia

<sup>7</sup> Department of Paediatric Dentistry, School of Medicine, Rijeka University, Rijeka, Croatia

## ABSTRACT

*The aim of this study was to examine differences between health condition of the first permanent molar (M1) in children in 1977 and 2007. The materials for the study consisted of data on the health condition of M1 determined in a study in 1977 (Group I) for children from the district of Buje in Istria. The health condition of M1 was examined again in the same area in 2007 (Group II). The first permanent molar is most frequently affected by caries and represent a good indicator for general caries incidence of children. Study included 709 subjects in Group I (363 boys, 346 girls) and 460 subjects in Group II (242 boys, 218 girls), aged from 6 years and 0 months to 12 years and 5 months. The difference in the frequency of intact, decayed, filled and missing M1 was examined in both groups.  $X^2$  test was used to determine the differences between the number of I (intact), D (decayed), F (filled) and M (missing) teeth for each age group in Group I and Group II. In Group I there were 29.3% intact, 48.9% decayed, 17.4% filled and 4.3% missing M1, and in Group II there were 53.0% intact, 22.6% decayed, 22.1% filled and 2.1% missing M1. During the period of 30 years, a significant increase of number of dental surgeries, and thus better preventive and health education, resulted in the significant increase in the number of intact (24.0%) and filled (4.7%) M1, and decrease in the number of decayed (26.3%) and missing (2.2%) M1. From 1977 to 2007, the number of intact M1 in group II increased considerably according to group I, while the number of decayed M1 in group II significant decreased according to group I. These changes were the result of a considerably increased number of dental surgeries.*

**Key words:** health, first permanent molars, thirty-year difference, Croatia

## Introduction

The first permanent molars (M1) are the most frequently affected by caries, and data of their health condition can serve as indicators of the success on the level of preventive and curative dental care<sup>1,2</sup>. During the last decades of the past century, the health condition of these and other teeth in many countries, including those in the region of former Yugoslavia, was poor<sup>1,3-13</sup>. In Republic of Serbia decayed first permanent molars were observed in 49.6% of seven years olds. Eight years olds displayed decayed M1 in 69.7% of cases, as well as 74.7% of nine to

fourteen year olds<sup>6</sup>. In Croatia 7889 first molars were examined in population of children aged from seven to thirteen years. In 33% of cases intact teeth were observed, 39.6% had decayed teeth, 22.1% filled and 5.3% missing teeth<sup>4</sup>. In Democratic Republic of Germany 70% of twelve year olds had decayed first permanent molars. From sixth year of life annual increase of M1 decay was 10%<sup>1</sup>. However, primarily due to preventive measures in the late 1970s, the health condition of teeth<sup>4-18</sup> have been considerably improved.

The aim of this study was to examine the differences between the indicators of the health condition of M1 determined in 1977 and 2007 in children from the region of Istria, Croatia.

### Materials and Methods

The materials for the study consisted of data on the health condition of M1 determined in a study in 1977 (Group I)<sup>5</sup> in children from the district of Buje in Istria, and the health condition of M1 in children from the same region examined in 2007 (Group II). The age of the subjects in both groups ranged from 6 to 12 years of age.

**TABLE 1**  
DISTRIBUTION OF SUBJECTS AND CONDITION OF M1 IN DIFFERENT AGE GROUPS

Age	N of subjects		N of M1	
	I group	II group	I group	II group
6	50	30	200	120
7	40	35	160	140
8	129	67	516	268
9	123	62	492	248
10	141	101	564	404
11	131	102	524	408
12	95	63	380	252
all	709	460	2836	1840

Group I included 709 subjects (363 boys and 346 girls), and Group II 460 subjects (242 boys and 218 girls). The study included children from the 1<sup>st</sup> to the 5<sup>th</sup> year of elementary school who were present in the class on the day of examination. All the children were examined by several dentists with many years of experience. The examination was carried out using a probe and a mirror without checking the results subsequently. Regarding the age, the subjects were divided into 7 age classes. The number of intact (I) (the presence of sealants were in-

cluded in intact teeth), decayed (D), filled (F) and missing (M) M1 was determined for each age group in both examined groups and  $\chi^2$ -test was used to determine the differences between the number of I, D, F and M teeth for each age group in Group I and Group II.

### Results

The results of the examination are shown in Table 2.

The number of intact M1 in Group I, age 6 to 12 years, decreased continuously during those years (97 to 4.5%). In Group II (apart from age 11) the number of intact M1 also decreased, although the decrease in relation to Group I was smaller (p=0.001). In Group II in all age groups from 8 to 12 there were statistically significant (p=0.001) more intact M1. There were 830 (29.3%) intact M1 in Group I and 980 (53.3%) in Group II. Between 1977 and 2007 the number of intact M1 increased by 24%. On the level of dental caries, there were 48.9% decayed M1 in Group I, and 22.6% in Group II. Caries prevalence of M1 decreased by 26.3% between 1977 and 2007. The percentage of decayed M1 in Group I in the age groups constantly increased (apart from age the group of 11 years) (from 3% to 60.8%). In Group II decay was also present, although not continuously. In Group I there were on average 1.96, and in Group II 0.90 decayed M1. The number of decayed M1 differed significantly (p=0.001). between Groups I and II in age group from 8 to 13 years. The number of filled M1 was not low in both groups (Group I 17.4%, Group II 22.1% – difference 4.7%). According to age groups, in Group II the percentage of filled M1 increased continuously (11.4%–38.5%). In Group I continuous increase in filled M1 was not determined. On average, the subjects in Group I had 0.7 and Group II 0.88 treated M1. There were statistically more filled M1 in the age groups 7, 8, 11 and 12 years of Group II (p=0,001). Subjects in Group I had 4.3% missing M1, while Group II had 2.1% (difference 2.2%). In Group I the number of missing M1 increased continuously with the age of subjects (1.2–10.5%), while in Group II the increase was not uniform. In Group I there were 0.17 missing M1 per subject and in Group II 0.08. In

**TABLE 2**  
DISTRIBUTION OF INTACT M1, DECAYED M1, FILLED M1 AND EXTRACTED M1 ACCORDING TO AGE

Age	Intact M1			Decayed M1			Filled M1			Extracted M1		
	I group (%)	II group (%)	p	I group (%)	II group (%)	p	I group (%)	II group (%)	p	I group (%)	II group (%)	p
6	97	94.0	0.214	3.0	5.8	0.214	0	0		0	0	
7	63.7	66.4	0.628	33.7	22.1	0.026	2.50	11.4	0.002	0	0	
8	44.3	65.7	0.001	46.5	20.5	0.001	7.90	13.1	0.022	1.2	0.7	0.565
9	22.8	47.9	0.001	54.1	29.4	0.001	20.10	20.6	0.887	3.1	2.0	0.414
10	19.1	54.4	0.001	37.8	22.0	0.001	18.30	21.5	0.206	4.8	1.9	0.021
11	12.9	46.1	0.001	50.6	21.3	0.001	29.80	29.4	0.004	6.7	3.2	0.017
12	4.5	28.2	0.001	60.8	29.0	0.001	24.20	38.5	0.001	10.5	4.4	0.005
all	29.3	53.3	0.001	48.9	22.6	0.001	17.40	22.1	0.001	4.3	2.1	0.001

the age groups 10, 11 and 12 years, subjects in Group I had significantly more missing M1 ( $p=0.001$ ).

## Discussion

Preventive programmes and the number of available dental interventions play the important role (among others) in prevention of dental caries and its treatment. Organised preventive programmes in the Republic of Croatia started in practice in 1979 and continued until 1995<sup>14</sup>. A great number of studies on the incidence of caries in Croatia, demonstrated their positive effects<sup>15,16</sup>. Until 1990, the establishment of private dental practice was not possible in Croatia. The children's health care was provided either by paediatric dentists or general dentists who provided service exclusively for children and were employed by the Ministry of Health. In the region of the Buje district, where the study was carried out, two dentists were responsible for 8,100 children, aged from 0 to 18 years. In 1995 dental health care for children was discontinued and children were treated by general dentists. In 2007 ten dentists, employed by the Ministry of Health, were responsible for the oral health of 31,036 inhabitants (8,960 were children aged 0 to 18). There were also 17 private dental surgeries in the area. With no doubt, the number of dental surgeries, together with other available means during that period, contributed to the increase of the number of intact and filled M1, and decrease of the number of decayed and missing M1. Due to the increase of number of dental surgeries, more attention have been given during examination and to the education of patients in oral hygiene; advice on the use toothpaste with fluoride, topical fluoridation of teeth

and fissure sealing of permanent premolars and molars. Since 1960 numerous authors have pointed to the decrease in the DMFT Index<sup>17–25</sup>. In this study it was determined that during the period from 1977 to 2007 there was a 26.3% decrease in the number of M1 affected by caries and 24% increase in intact M1 in children aged from six to twelve years. Improvement of oral health is related to the investments of the state in national health. Thus, the number of decayed teeth is more decreased in developed countries than in developing countries, in which there is a possibility of increased decay<sup>26–30</sup>. Since the intention is to improve the health condition of children's teeth in Croatia, then separate dental surgeries should be established and supported by the Ministry of Health for children and adults. The health authorities should allocate special funds for health education and caries prevention programmes.

## Conclusions

From 1977 to 2007, the number of intact M1 increased considerably in children of the same geographical region, while the number of decayed M1 significantly decreased. The observed changes in prevalence of sound and decayed teeth are due to the performed preventive dental procedures in children under study.

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Z. Kováč

Department of Prosthodontics, School of Medicine, Rijeka University, Krešimirova 40, 51 000 Rijeka, Croatia  
e-mail: Zoran.Kovac@medri.hr

**ZDRAVSTVENO STANJE PRVIH TRAJNIH MOLARA DJECE U RAZDOBLJU  
OD 1977. DO 2007. GODINE U ISTRI (HRVATSKA)**

**S A Ž E T A K**

Cilj ovoga rada bio je ispitati razlike zdravstvenog stanja prvih trajnih molara (M1) kod djece u 1977. i 2007. godini. Kao materijal poslužili su podaci pregleda zdravstvenog stanja M1 709 ispitanika u 1977. godini (grupa I) i 460 ispitanika u 2007. godini (grupa II) u Istri-Hrvatska. Ispitanici su bili stari od 6 do 12 godina. Ispitana je razlika frekvencija intaktnih, karioznih, saniranih i ekstrahiranih M1 između obje grupe. U grupi I bilo je 29,3% intaktnih, 48,9% karioznih, 17,4% saniranih i 4,3% ekstrahiranih M1. U grupi II bilo je 53% intaktnih, 22,6% karioznih, 22,1% saniranih i 2,1% ekstrahiranih M1. Kroz period od 30 godina znatnim povećanjem broja stomatoloških ordinacija, a time i boljom preventivom i zdravstvenim odgojem, signifikantno je povećan broj intaktnih (24,0%) i saniranih (4,7%), a opao broj karioznih (26,3%) i ekstrahiranih (2,2%) M1.