

## Epidemiology

**KEYWORDS:** incidence, caries, children, Croatia

## CARIES INCIDENCE IN CHILDREN OF PRIMORSKO GORANSKA COUNTY, CROATIA



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#### ABSTRACT:

**Introduction:** The aim of this study was to investigate the incidence of caries in a 6-year follow-up study, to determine the Treatment Needs Index for dental caries, and the restorative Care Index. Methods: The study included children aged six years in 2008. Later, in 2014, those same children were examined again at the age of twelve. There were included 1369 children, 630 girls and 739 boys. The clinical examination was carried out by one skilled examiner helped by assistant through a 3 month period during the academic years 2008 and 2014. Results: Seventy four percent of six years olds presented with caries as opposed to later examination at the age of twelve in which 59% of the children presented caries experience. The mean dft index in the 6 years period decreased from 4.79 (SD4, 85) to 1, 08 (SD1, 72). Treatment Needs Index for primary teeth at the age of 6 and 12 years were 76.07% and 81.13% respectively. Care Index of primary teeth at six years olds showed only 20% of treated teeth and in twelve years olds 22%. Conclusion: Caries incidence shown by mean DMFT/dft index has increased in period of six years between two examinations. Inversely, it was observed an increase of the caries free children at the level of permanent dentition. Clinical relevance indicates need for increased awareness of the importance of care about permanent teeth.

#### 3. Main text

##### INTRODUCTION

Oral health is an important component of general health. It has an impact on quality of life because, e.g. dental caries can influence on a person's ability to eat, speak or socialise [1]. The incidence of dental caries in children is often related to the lifestyle of every individual.

Incidence shows the rate of newly diagnosed cases of the disease. Generally, it is reported as the number of new cases occurred within a period of time [2-5]. Today caries is still a very significant public health problem and one of the most common diseases in children [6-8].

In the last 20-30 years significant improvements in children's oral health are made in many developed countries [5-10]. During this last decades the experts agreed that caries activity is statistically declined in the population and continues to decline. Significant efforts are done to achieve a reduction in cavities in organized societies, including the: use of systemic and topical fluoridation, improvements in diet counselling, oral health education and care for oral health in general which resulted in the decline of caries activity [5-11].

On the other hand, the results show that the growth of caries activity can be seen in less developed societies, immigrants and children. Unfortunately, the benefits of prevention programs have not yet reached those groups [9-11].

According to the World Health Organization (WHO) great importance is given to six year olds and twelve year olds. Six years old children represent a relevant group for caries assessment at the level of primary dentition, which shows greater variation in a shorter span of time, while twelve year olds represent a relevant group for permanent dentition due to presence of all permanent teeth except the third molars. This group is relevant for caries assessment in the permanent dentition [12,13]. Also at the age of six are mostly present first permanent molars, which are very important for the further development of the dentition. In addition, twelve year olds are taken into account as the default age of global studies and international comparisons of movement of oral cavity diseases. Well processed oral health data are the basis for planning and

implementation of health policies in all countries [12-14]. The aim of this study was to investigate the incidence of caries in a 6-year follow-up study, to determine the Treatment Needs Index (TNI) for dental caries, and the restorative Care Index (CI), among children in Primorsko Goranska County (PGC), Croatia

**MATERIALS AND METHODS**

The study included all schoolchildren from PGC aged six years in 2008. Later, in 2014, those same children were examined again at the age of twelve. There were included 1369 children, 630 girls and 739 boys. The clinical examination was carried out by one skilled examiner helped by assistant through a 3 month period during the academic years 2008 and 2014. All parents/guardians of all participants involved in the study gave verbal consent and the consent procedure was approved by the ethics committee/institutional review board. This research was conducted in full accordance with the World Medical Association Declaration of Helsinki and approved by the Ethics Committee of the Faculty of Medicine of the University of Rijeka, Croatia and was conducted during the academic year 2008/2014.

The examination was carried out by the " lift the lip " technique. For indirect view of lingual and palatal teeth surfaces single use mouth mirrors were used. For lighting, the head lamp was used. Caries was recorded according to WHO criteria, only if there was a visible evidence of tooth cavitation. DMFT index and dft index were assessed. To obtain further results, other indices such as TNI and CI index were used. They were derived and calculated from the underlying DMFT and dft index [15-18]. Statistical analyses were carried out using SPSS Version 17.0 (SPSS Inc., Chicago, IL, USA).

**DISCUSSION**

Results of this study showed that 74% of six years olds presented with caries as opposed to later examination at the age of twelve in which 59% of the children presented caries experience. A significant increase in caries free children is shown. Based on a review of all the teeth examined in different periods, values of dft and DMFT index were calculated. Based on those values TNI and CI index were assessed. The value of the mean dft index in the 6 years period decreased from 4.79 (SD4,85) to 1,08 (SD1,72), which is logical because of the very few remaining primary teeth at the age of twelve. On the other hand, the value of the mean DMFT increased from 0,21 (SD 0,67) to 1,27 (SD1,72) which is supported by the increased number of permanent teeth in twelve years old and their longer presence in the oral cavity. In a similar Swiss study, a slight increase in the mean DMFT index was seen among children of Swiss nationality and origin. The value increased from 0,12 to 0,73, but in children of immigrant origin increase was even greater, it was from 0,21 to 1,27 as identical value to our DMFT index [19]. Such results were to be expected because these immigrants at that time originated from our territories, the Balkans, but now they come more from the Middle East. Similar dft values were presented in study from Georgia but for DMFT was reported some worse results of 2.04 [20]. Better results for dft showed a study from Greece, but the same study presents DMFT of 1.35 [21]. A similar increase is present in certain Italian study [22]. The drop of DMFT values was reported by some other studies from: Scotland, Ireland, Poland and Finland. They attributed this decrease to intensive and high-quality prevention programs [23-26]. TNI index for primary teeth shows that at the age of six years there were 76.07% of untreated teeth, and in twelve years olds this ratio also went in favour of untreated teeth, up to 81.13%. In permanent teeth the situation is much better, at age of six there was 66.66% of untreated teeth, hence 2/3. In twelve year olds, 2/3 were treated (32.20%), this shows greater concern for the permanent teeth in the six years olds but especially in twelve years old. CI index of primary teeth at six years olds shows that only 20% of the teeth were treated while in 12 years old 22% of the teeth that needed treatment were restored. The 80% and 78% of untreated teeth among 6 and 12 years olds respectively remained untreated. This points to extremely poor dental care for primary teeth. In

permanent teeth of six years olds 42% was treated, while in twelve years olds 70% of the teeth were treated. This is not surprising because dentists can manage those children easier than the small ones. (Figures 1-4)

They are usually less cooperative and then the therapists tend to avoid to work with such small children, resorting to the myth that "primary teeth should not be treated, they will obviously shed anyway". This attitude of course, dental profession and medical science does not approve! From this data it can be concluded that public health have large impact, in this case the field of dental medicine and prevention programs. This impact on the incidence of dental caries in children can be perceived through the years of work in kindergartens, schools and educational institutions in general. Contact with information on oral health and the preservation of oral hygiene at an early age is very important for the child development and later the society as a whole [27,28].

**CONCLUSIONS**

Caries incidence shown by mean DMFT/daft index has increased in period of six years between two examinations. Inversely, it was observed an increase of the caries free children at the level of permanent dentition. This indicate only increased awareness of the importance of care about permanent teeth. Indices indicating the level of dental care are not satisfactory.

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**Ethical approval:** This article does not contain any studies with human participants or animals performed by any of the authors./All applicable international, national, and/or institutional guidelines for the care and use of animals were followed./All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent:** For this type of study, formal consent is not required. /Informed consent was obtained from all individual participants included in the study.

**6. Figures and legends**

Percentage of children affected by caries

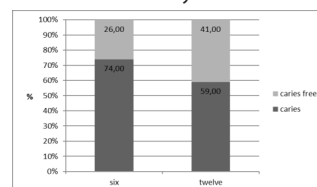


Figure 1. Percentage of children affected by caries

DMFT and dft value

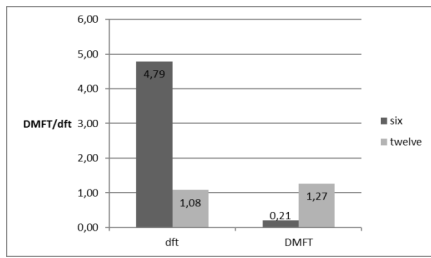


Figure 2. DMFT and dft values comparison

TNI values

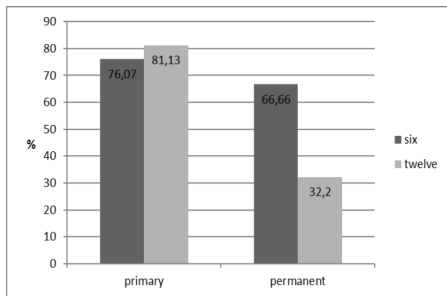


Figure 3. TNI values comparison

CI values

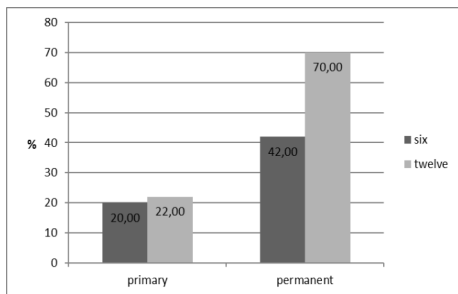


Figure 4. Treated teeth percentage comparison (CI)

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