

# HEALTH STATUS OF FIRST PERMANENT MOLARS IN CHILDREN FROM ROMANIA- A RETROSPECTIVE OBSERVATIONAL STUDY

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## Abstract

First Permanent Molars represent an important indicator of the status of oral health of children. They are the first permanent teeth to make their eruption in the oral cavity and influence the development of the maxilla and the mandible. Our study wishes to assess the oral status of these teeth in children between 7 and 15 years of age. A retrospective observational study was designed using complete dental charts from 1213 children. DMFT index for all four first permanent molars was analyzed. Data was interpreted by simple descriptive statistics. Results present a high prevalence of caries among studied children, prevalence that increases in correlation with age. Mandibular first molars are more affected than maxillary ones. Intensification of programs to increase awareness of the importance of oral hygiene is advised. Prevention measures for dental decay in children and young adolescents are mandatory.

**Keywords:** DMFT index, First permanent molar, Oral health in children,

## Introduction

Unfortunately in present times tooth decays remain a globally widespread health problem which has direct impact on the quality of life. When the individual suffering from dental caries is still in a developmental stage, such as children and adolescents their health and growth are affected because caries can be associated with lack on weight gain if they remain untreated[1]. The World Health Organization (WHO) estimates that one third of world population doesn't have access to health care and in countries with low-income dental restorative treatments don't represent a priority for the healthcare system. In countries with a better developed healthcare system the prevalence of dental caries has been reduced in the 20<sup>th</sup> century, however tooth decay remains as a sign of an economic problem and a major public health challenge in developing countries [2].

The most susceptible tooth to dental caries is the first permanent molar as it emerges early, usually at the age of 6,

children might not be well accustomed to correct toothbrushing at that age and parents might mistake it for a deciduous tooth and ignore the first sign of caries and therefore this tooth is more prone to premature extraction even before 15 years of age [3]. The first permanent molar is essential in maintaining a normal masticatory function and dento-facial harmony. When affected by tooth decay, before treating the first permanent molar there are multiple factors to be considered such as the degree of pulp maturation, the status of the developing dentition, the severity of crown destruction, the level of the pain on a visual scale, the cooperation of patient and parents, the ability to withstand the treatment under local anesthesia. More often than not, some clinicians are more inclined to early extraction due to a rather poor prognosis after treatment and supporting the mesial eruption of second molar in the place of the first permanent one[4].

Nowadays, there is a world-wide movement of raising the awareness regarding health issues and within this movement oral health education is very important. However it is a must that correct information in respect with the health status of the communities is delivered, so the prevention programs are adapted to the society's needs.

The present study wishes to provide information regarding the health status of permanent first molars using the DMFT index in populations from two regions in Romania.

## Materials and Methods

The study consisted in a retrospective analysis of dental charts from children and adolescents that have been treated in the Clinical Regional Hospital and Faculties of Dentistry in Cluj-Napoca and Timisoara during a period of two years 2016 and 2017. Data was gathered during the first four months of 2018. The approval of the protocol for this study was given by the Ethics Committee from the "Iuliu Hațieganu" University of Medicine and Pharmacy from Cluj-Napoca, Romania.

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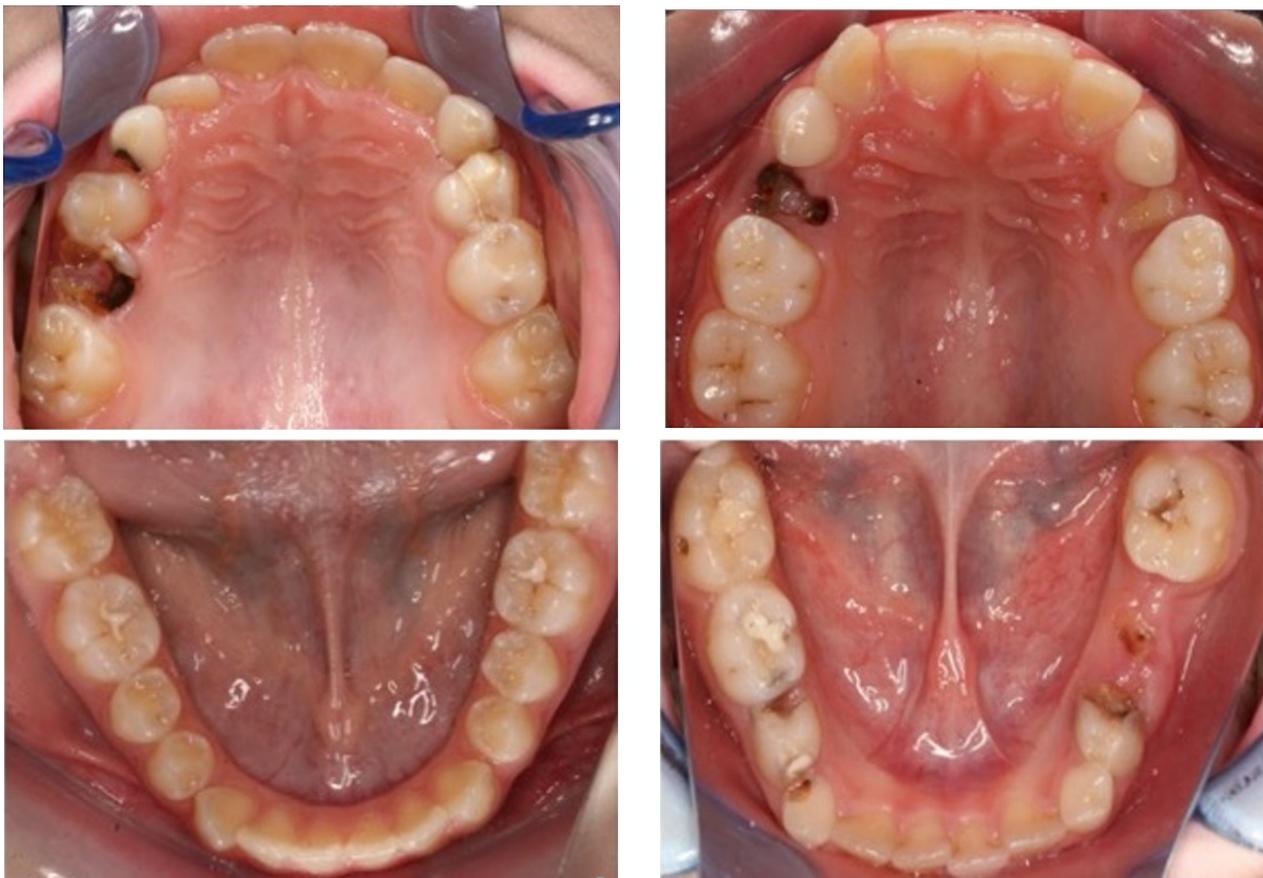
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The inclusion criteria for the dental charts to be part of the study were:

- Age of patient between 7 and 15 years of age, patient must have had permanent residence in Romania for more than 5 years
- Patient presented for treatment for the first time

between 1<sup>st</sup> of January 2016 and 31<sup>st</sup> of December 2017

- Charts were completed and/or verified by an attending specialist and were complete with initial dental and periodontal status, initial intra-oral photographs (figure 1), initial panoramic radiographs



Picture 1. Examples of examined maxillary and mandibular arches.

All charts that were incomplete, that were of patients who previously benefitted from dental treatment in the same dental clinic, or were under the supervision of residents and have not yet been verified by the attending specialist were dismissed from our study. Patients that have not had a permanent residence in Romania for 5 years or more were excluded from the study as it was considered that they may have benefitted from a National Prevention Program in their former country of residence and therefore results including them might be biased. A comparison between urban and rural based patients was done but not a comparison between the two regions as all data gathered between the two clinics was processed together.

1213 charts of patients from the two Dental Clinics were included in this study. There was observed that from 9743 new charts of patients between 7 and 15 years that were registered in the two Oral Healthcare units only 1213 had complete records with photographs and panoramic investigations.

Teeth that had sealants in pits and fissures were considered sound if there was no sign of marginal microleakage, otherwise they were considered with decay. Teeth presenting extensive sealants in pits and fissures were considered having fillings.

The description of the included population for our study is described in Tables 1 and 2.

Gender/ Living environment	Urban	Rural	Total
Female	349	279	628
Male	327	258	585
<b>Total</b>	<b>676</b>	<b>537</b>	<b>1213</b>

Table 1- Description of the population incthough luded in the study regarding their gender and living environment.

Gender/ Age	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Total
Female	72	65	47	56	68	75	89	87	69	628
Male	53	72	39	45	71	83	79	82	61	585
<b>Total</b>	<b>125</b>	<b>137</b>	<b>86</b>	<b>101</b>	<b>139</b>	<b>158</b>	<b>168</b>	<b>169</b>	<b>130</b>	<b>1213</b>

Table 2 -Description of the population in regard with their age and gender.

Throughout the study a number of 4852 permanent molars from our 1213 patients were assessed. The study did not take into consideration the physiological age of eruption of teeth therefore, even if the first permanent molar was not fully erupted in the oral cavity for example at the age of 7, if it's presence was shown on the panoramic radiograph it was taken into account for the study. Their assessment was done using the DMFT index (Decay, Missing, Filling Teeth Index).

The gathered data was analyzed and interpreted using simple descriptive statistics with the help of Microsoft™ Excell 365 Software.

**Results**

Within the 1213 patients there were 2 who were diagnosed with agenesis of first permanent molars, and both cases had this condition present in the lower jaw, bilaterally and both cases were of male gender. The missing teeth were counted in the Missing component of the DMFT index although they were not extracted.

Distribution of the examined teeth in respect with age of patients is shown in Figure 1. There has been found a normal distribution of children in regard with the age although the percentages of children between 12 and 15 years old were slightly higher. DMFT index for first permanent molars were assessed for children according to each age as shown in Figure 2.

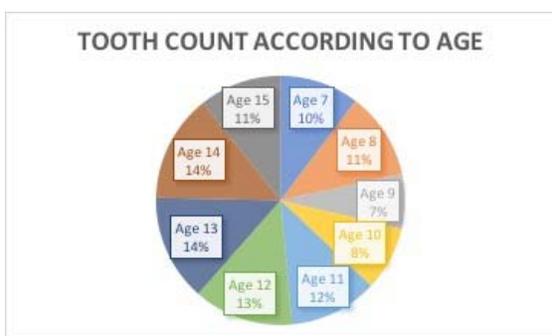


Figure 1. Distribution of examined teeth according to age.

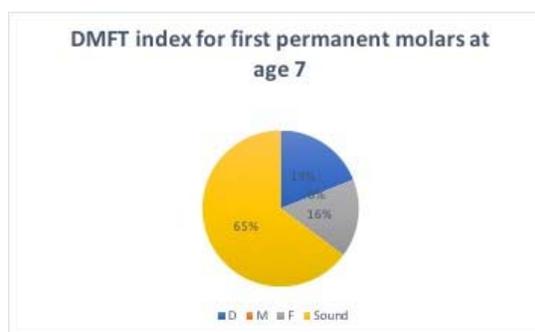


Figure 2. DMFT index assessment for children of 7 years of age.

DMFT index for first permanent molars in each quadrant was compared at different ages as seen for examples in figures 3 and 4 where DMFT index for tooth 1.6 (Upper first right permanent molar) was assessed at ages

7 and 15. It was observed that in children older in age there is a decrease of the percentage of healthy and sound 1.6 and an increase of the percentage of teeth with fillings and teeth that were missing.

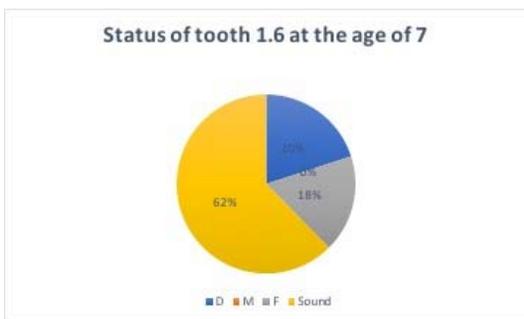


Figure 3. Status of tooth 1.6 in patients with 7 years of age.

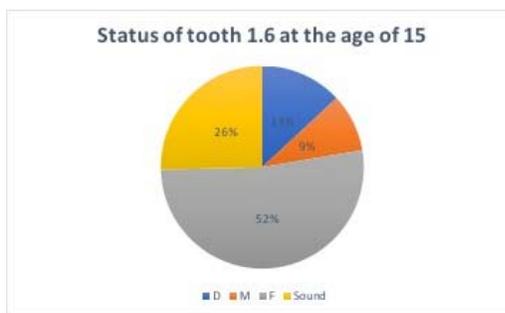


Figure 4. Status of tooth 1.6 in patients with 15 years of age.

The overall DMFT index for the first permanent molars in children between 7 and 15 years of age showed that 35% of teeth were healthy and sound not presenting any signs of caries or fillings, 43% of teeth were affected and have already been treated, 16% presented active carious lesions that demanded treatment in the future and 6% of the first permanent molars have already been extracted. This means that in children of our studied age groups there is a prevalence of 6% of early permanent molar extraction due to carious complications and a prevalence of 65% of caries as only 35% were sound teeth (figure 5).

Authors find encouraging the fact that overall prevalence of treated first permanent molars was three times higher than the active caries prevalence as it represents a sign that the communities are active in seeking dental treatment in order to reduce the prevalence of extraction.

DMFT Index was studied for each of the four permanent molars in respect with age and a comparison between the different ages has been conducted. As seen in figures 6 to 14 there has been observed that in children of a higher age the percentage of sound teeth decreases in all four quadrants. It has also been observed a difference between the upper quadrants and the lower quadrants as there seem to be more affected lower first permanent molars than upper ones. Starting from the age of nine there is a clear tendency that lower molars are less healthy than the upper ones. Also it has been observed that if in children of 7 years of age there were no missing first permanent molars, in elderly children that is no longer the case and there has also been observed a strong correlation ( $p < 0.039$ ) between the age and the increase of prevalence for fillings and extractions.

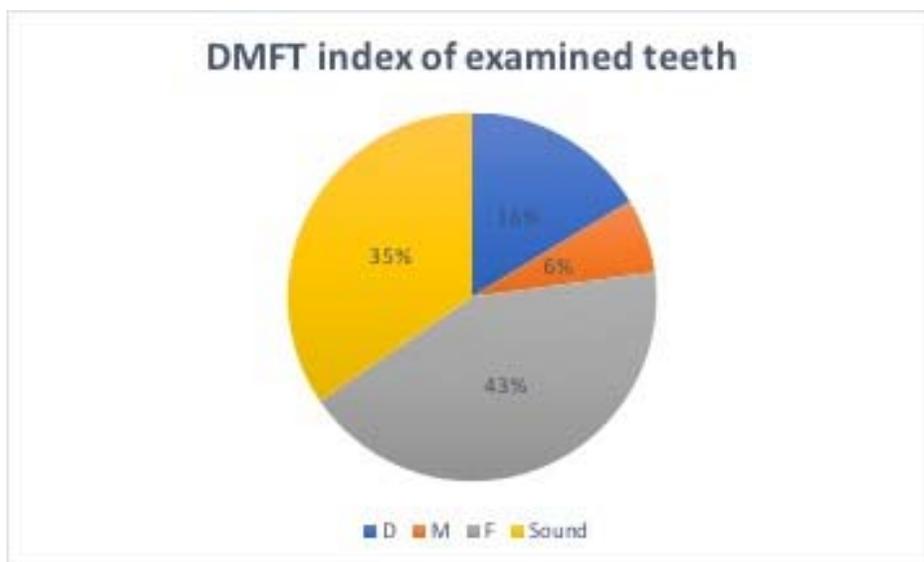


Figure 5. DMFT index assessment for all 4852 examined teeth.



Figure 6. Status of First Permanent Molars at different ages.

There have not been found any significant differences between children from urban and rural environment. Although it was suspected to be one of this study's null hypothesis it has been denied by our ANNOVA tests. Even if there was observed that at an early age (7-9 years old) more patients (67 %) were from the urban environment the percentages between the two populations in regard with the DMFT index for the first permanent molars were similar. Patients from 10 to 15 years of age had a more normal distribution in respect with their living environment and also similar percentages in the DMFT index.

Another null hypothesis of our study was that there would be significant differences between patients of different genders and this hypothesis has also been rejected by our study.

While assessing the overall DMFT index assessment at different ages (Figure 7) we can observe that there is an abrupt decrease in the health of first permanent molars between the ages of 8 and 9 and afterwards this situation is somewhat constant. Also, the number of fillings is abruptly increasing between 10 and 12 years of age and decreases after the age of 14. The percentages of carious lesions are somewhat constant from 7 to 15 years of age showing that there is a constant preoccupation from patients and healthcare providers to treat the increasing carious lesions. Unfortunately there was observed a slow but constant increase in the percentage of missing molars due to early extraction between 8 to 15 years of age meaning that some carious lesions are suffering from early complications.

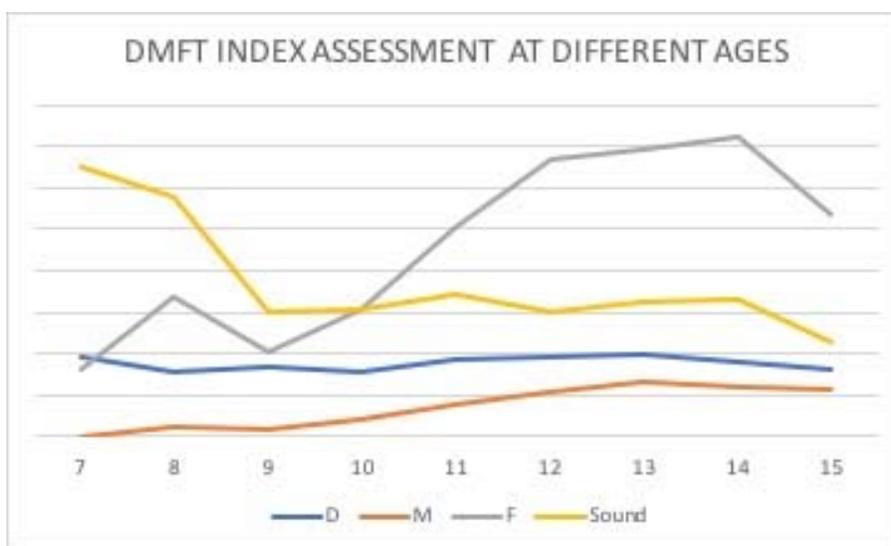


Figure 7. DMFT index status at children of different ages between 7 and 15.

### Discussion

Our study investigates the health status of first permanent molars among children between 7 and 15 years of age of Romanian population. The study was focused on the first permanent molar as it plays an important role in maintaining oral and general health of the individual. They are the first permanent teeth to erupt in the oral cavity and have a great influence over the eruption of other permanent lateral teeth[5,6]. Also, the first permanent molars are the largest teeth in the oral cavity and support the maximum occlusal forces. They have important influence in the vertical development of the face, the occlusal height and vertical aesthetic proportions. They also represent the best dental anchorage for orthodontic treatments [7,8]. All this characteristics render the first permanent molars as key elements in the normal development on the individual. Due to their physiological functional and morphological particularities they are more vulnerable and represent a good starting point in assessing the oral status of children[7].

The study was done by examining the dental charts of children at one point in their development. A longitudinal

study where observations of the charts could be done throughout several consecutive years would provide better understanding of the dynamics in oral health status. In our study 35% of the examined molars were free of caries but DMFT index for first permanent molars has increased with the increase in age among the studied group. Our results are in agreement with similar studies [7,9,10] conducted in developed and developing countries throughout the world. The increase of the number of affected teeth in correspondence with the increase of age can be explained by the fact that caries being a cumulative and continuous process have increased in time. Another finding, that was consistent with studies conducted by Șerban, Maxim and Balan [10] in other regions from Romania is that mandibular first permanent molars appear to be more affected by decay than maxillary ones an explanation being the difference in morphology where the mandibular first permanent molars exhibit more pits and supplementary grooves that are retentive for food and therefore promote more caries. Another explanation can be the fact that mandibular first permanent molars erupt usually before their maxillary

counterpart and therefore are exposed longer to the oral flora.

**Conclusions**

A high prevalence of caries affecting the first permanent molars was observed in children between 7 and 15 years of age.

The elder the patients were the higher the prevalence of caries and the higher the DMFT index was.

Mandibular first molars are prone to be more affected than maxillary first permanent molars.

There was no statistically significant difference found in the DMFT Index between children from urban and rural environment.

There was no statistically significant difference found in the DMFT index between male and female patients.

The increase in percentage of teeth with fillings show interest within the population in regard with their oral health status.

Authors recommend intensification of preventive dental health programs in schools. Such educational programs may consist of following; awareness programs for children and parents, regular check-ups in schools, application of fissure sealants, topical fluoride and home care instructions.

**Conflict of interests**

The authors declare they have no conflict of interest with conducting and publishing this study.

**Acknowledgment**

All authors are considered to have equal contribution in the development of this study and writing of the article.

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