

## MIXED DENTITION CARIES – PREDICTOR OF CARIOUS ACTIVITY IN PERMANENT DENTITION

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### ABSTRACT

**Aim of the study** is the optimisation of the child's dental management, especially regarding the health and odonto-periodontal integrity of mixed dentition. **Materials and methods** We performed a clinical and paraclinical population based study from the point of view of carious activity in mixed dentition on a lot of 212 subjects with the ages between 6 and 12 years, from urban and rural areas of Bacau and Iasi. **Results** In 84.32% of cases the dmft >0, in 50.98% exists an association with DMFT >0. Low frequency of tooth brushing associated with dmft >0, lead to an increased risk of caries in permanent dentition. In the studied lot most children admit eating sweets (86.79%), of which 65.21% have over two snacks a day between main meals. **Conclusions** It is considered that clinical variables associated with consumption of carbohydrates or with *Streptococcus mutans* and *Lactobacillus acidophilus* presence or with low frequency of tooth brushing can be relevant predictors for the occurrence of dental caries in mixed dentition and permanent dentition.

**Key words:** child, mixed dentition, dental caries, predictor of carious, permanent dentition

### INTRODUCTION

Dental caries is an infectious disease [1] in which bacterial fermentation from the plaque due to a rich diet of carbohydrates produces organic acids that erode the hard tissues of teeth [2], being the chronic disease with the highest prevalence in paediatric communities, affecting more than 40% - 50% of USA and UK children [2] and 60% - 90% of children worldwide between the ages of 2 and 11 years [3, 4].

Caries prediction methods can be helpful in identifying the patients with carious risk; also they can help in selecting a high risk fraction from a group of subjects. Caries prediction

methods have been developed by combining bacterial tests and salivary tests [5] with oral hygiene scores and dietary factors [6, 7]. Other prediction methods have combined these risk factors with risk indicators like the socio-economic status [8, 9].

Caries experience in three or more temporary molars at the age of 5 was the best predictor of caries experience in the permanent first molars at the age of 7 [10]. Numerous previous studies confirmed the major impact of the status of the temporary dentition depending on the occlusal plaque accumulation, reported brushing frequency and gender, on the incidence of visible caries

experience in permanent first molars [11].

After reviewing the literature on caries prediction it has come to the conclusion that clinical variables, especially past caries experience, are confirmed as the most significant predictors of future caries [8].

In developing countries, the reverse social trend is observed, where the majority of children from urban areas present the highest carious experience [12].

In industrialized, the highest countries caries experience is identified in deprived social groups and ethnic minority groups [12].

In the past 30 years, in most developed countries of the world, there has been a striking decrease in the frequency and prevalence of caries disease, with a marked expression by using fluoridated water, fluoride toothpastes often correlated with the implementation of educational program for oro-dental health, and the opportunity for a healthy lifestyle.

The aim of the study: the optimisation of the child's dental management, especially regarding the health and odonto-periodontal integrity of mixed dentition with an especially long term pedodontic-orthodontic impact.

Objective of the present study is to establish a correlation between the carious experience in mixed dentition and the caries in permanent dentition, by identifying risk factors – predictors of caries in the permanent dentition; investigating interrelationships between approximal caries of primary molars and first permanent molar caries, and investigating primary dentition and/or mixed dentition carious damage of the as a predictor of caries damage in the pits and fissure of permanent molars.

## MATERIALS AND METHODS

In building, supporting and achieving the objectives and the intended purpose, we performed a clinical and paraclinical population based study from the point of view

of carious activity in mixed dentition on a lot of 212 subjects (108 boys and 104 girls) with the ages between 6 and 12 years, originating from urban and rural areas of Bacau and Iasi. The study is an integrative part of an ongoing longitudinal mixed study undertaken by The Department of Dentoalveolar and Oro-Maxillofacial Surgery, Faculty of Dentistry U.M.F. „Grigore T. Popa”, Iasi.

The criteria for inclusion in the lot were:

- Filling out the informed consent form, mandated, written and signed by the legal caregivers;
- Children without significant correlative medical history.

The criteria for exclusion from the lot:

- Uncooperative children;
- Children whose legal caregivers have not signed the informed consent form, mandated, written and signed;
- Children with a chronological age under 6 years or over 12 years.

For eloquence, we compared the data obtained by us with the data found by conducting a search in international electronic databases (e.g. Science Direct, Pub Med).

## RESULTS AND DISCUSSIONS

In 65.81% of the studies mentioned as reference, the major predictor of dental caries in permanent dentition was the dmft index values greater than zero.

Approximately 20% of the studies have analysed the association between dmft index, frequency of teeth brushing and carbohydrate intake, concluding that the association between a value of the dmft index greater than zero, the consumption of sweets (from the age of 1 year) and irregular teeth brushing, has a predictor role in the occurrence of approximal carious lesions during adolescence.

10.35% of the investigated studies have revealed the fact that a higher frequency of tooth brushing combined with an elevated

socioeconomic level is associated with significantly fewer incipient carious lesions.

The frequency of dental caries in mixed dentition and the bacterial factor, represented by *Streptococcus mutans*, were significantly correlated in 10.5% of studies with increased carious activity in permanent dentition. In 33.33% of these studies, authors have also added to the list of risk factors the presence of the *Lactobacillus acidophilus*.

Although in most investigated studies the major predictor of caries in the permanent dentition is considered to be the value of the dmft index, in 3.45% of the studies the prediction model of this entity is represented by the clinical variables (dmft, DMFT) and non-clinical variables (the socio-economic and the mother's education levels).

In 6.89% of the studies, it was found that the presence of carious lesions on approximal surface of the primary molars during the clinical eruption of the first permanent molars leads to a 15 times increase rate in the development of caries in the pits and fissures of the first permanent molars.

The performed inquiry on the Department

of Pedodontics, Faculty of Dentistry – UMF “Grigore T. Popa” revealed similar results to those found in the specialty literature reviews, primarily from the point of view of the major role that the dmft value has in predicting the appearance of caries in permanent dentition

In our study group the male percentage is approximately equal to that of the females (Fig.1); subjects aged between 6 and 8 years are predominant (approximately 45%), followed by those aged between 8 and 10 years (approximately 36%) and the lowest percentage is represented by the 12 year old subjects (3.77%) (Fig. 2).

In 84.32% of cases the dmft value was greater than zero, in 50.98% exists an association with the value of the DMFT index higher than zero, and 33.33% have an association with the value of the DMFT index equal to zero (Fig. 3).

There were also cases (5.88%) where although the dmft value was zero, the DMFT value was greater than zero, fact which confirms the hypothesis that primary teeth affected by caries are not the only predictor of dental caries appearance in permanent dentition.

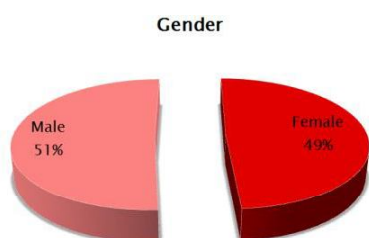


Fig. 1. The gender ratio of subjects in the group of studied children

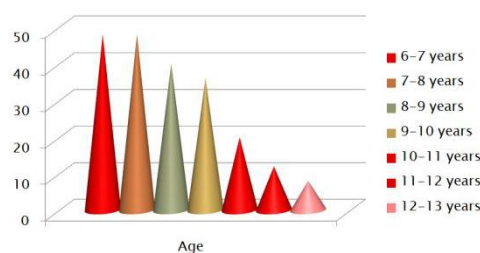


Fig. 2. Age distribution of subjects

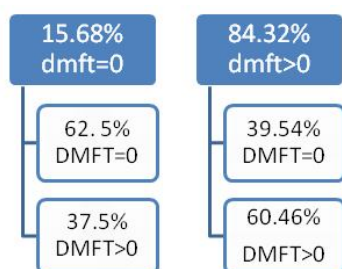


Fig. 3. Value dmft index correlated with value DMFT index in the group of children studied

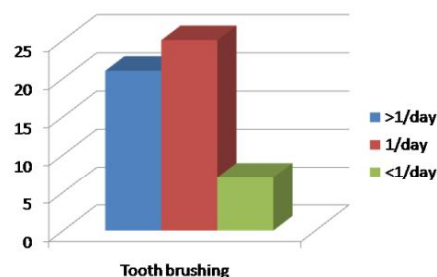
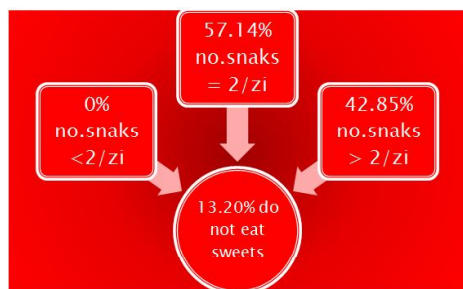


Fig. 4. Brushing frequency in the group of studied children



**Fig. 5.a. Correlating the number of snacks with carbohydrate intake in the group of studied children**

One of the prediction factors mentioned in specialty literature is the frequency of the tooth brushing. Low frequency of tooth brushing associated with dmft values higher than zero, lead to an increased risk of caries in permanent dentition (Fig. 4).

Other mentioned risk factors are the consumption of carbohydrates and the number of snacks between main meals. In the studied lot most children admit eating sweets (86.79%), of which 65.21% have over two snacks a day between main meals (Fig. 5a,b).

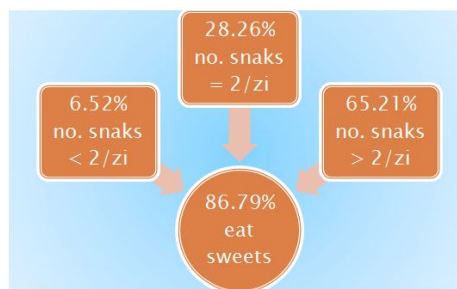
## CONCLUSIONS

It is considered that clinical variables (dmft, DMFT) can be relevant predictors for the occurrence of dental caries in mixed dentition and permanent dentition.

Caries lesions of primary teeth along with the consumption of carbohydrates (sweets) were associated with the occurrence of proximal lesions of permanent teeth in adolescents, and especially first permanent molars were affected.

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**Fig. 5.b. Correlating the number of snacks with carbohydrate intake in the group of studied children**

The combination of a large number of incipient caries, *Streptococcus mutans* and *Lactobacillus acidophilus* presence, represent a predictive model for carious lesions in permanent dentition.

The bacterial level (*Streptococcus mutans*, *Lactobacillus acidophilus*) is included with the highest accuracy in prediction models of caries in the permanent dentition.

Increased frequency of tooth brushing associated with a higher socioeconomic level, along with the mother's/legal carer's education level and reducing snacks, are considered unfavourable elements for caries development in the permanent dentition.

Mentioned aspects can become effective conceptual and lucrative opportunities to improve the child's dental management.

## Acknowledgements

The authors would like to thank Prof. Adam A. Maxim for the support and constructive comments.

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