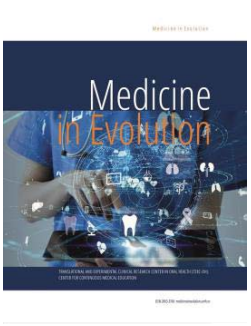
Dental Erosion in Children and Adolescents from Timiș County – a Statistical Study



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Abstract

The study that we conducted highlights the role of the level of awareness among legal representatives of minor patients regarding dietary habits, interest in dental hygiene, and the presence of potential conditions that may influence the occurrence of dental erosion. Through a questionnaire, the study will examine both the parents' or caregivers' knowledge level on these aspects and the dietary behaviors of the children and adolescents in question.

Dental erosion is the consequence of dental wear through the contact of an acid substance with the dental surface, without bacterial component being involved. The first side effect, which is also pointed out by the patient is flagged by the loss of dental hard substance, which brings with it the unaesthetic appearance of the teeth. Before reaching dental sensitivity or pain, the patient faces the unaesthetic aspect of lesions. This effect is increasingly common as, in recent times, more and more individuals emphasize aesthetic appearance. Regarding pediatric patients, their requirements are not very demanding initially, gaining significance later when they are integrated into a collective environment.

Keywords: erosion, tooth substance, minor patients, dietary habits

INTRODUCTION

Dental wear is a more general term, that includes various processes, these leading to an irreversible loss of dental hard tissue. Dental wear is also known of being the result of three main processes: erosion, attrition and abfraction (1).

Dental erosion is the result of dental wear resulting from the interaction of acid substances with the dental surface, without the involvement of bacterial components. The initial noticeable consequence, as reported by the patient, is the loss of tooth structure, leading to an aesthetically undesirable appearance of the teeth. Prior to the onset of dental sensitivity or pain, patients grapple with the unattractive aspect of these lesions. This phenomenon is becoming increasingly prevalent, particularly as contemporary individuals place a growing emphasis on aesthetic concerns.

In the case of pediatric patients, their aesthetic requirements may not be highly demanding initially but gain significance as they become integrated into a communal environment. The shift towards aesthetic considerations is especially noteworthy in recent times, reflecting the evolvement of societal values.

Due to the thinner enamel layer and lower mineralization, primary dentition is much more susceptible to erosion, increasingly prevalent among children. It has been reported that the prevalence of dental erosion in children varies between 10% and 80% (1).

Understanding the basic structure of teeth is crucial for comprehending pathological processes. Enamel, due to its mineralization, is vulnerable to demineralization caused by acids, and since it cannot be replaced, a balanced diet and perfect oral hygiene are necessary (2).

Dental erosion is defined as the irreversible loss of tooth material through a chemical process, with no involvement of bacterial components. The prevalence ranges from 8.9% and can reach up to 46% among healthy children and adolescents. This condition is associated with intrinsic and extrinsic factors (3).

More commonly seen in pediatric dentistry, with dental complications such as dental sensitivity, alteration of aesthetics, feeding difficulties and loss of vertical occlusal dimension (4).

Dental erosion is a condition that extends over a longer duration of life, encompassing multiple stages, including the erosive activity period and the latency period. The only means to prevent the onset and progression of these lesions are early identification and removal of intrinsic and extrinsic etiological factors (5).

DENTAL ATTRITION

The confirmation of dental wear occurs after analyzing various signs and symptoms that the patient may present, such as:

- Alteration of the aesthetic appearance of the tooth;
- Sensitivity to contact with chemical, mechanical, or thermal stimuli;
- Cracking/fracturing of teeth or prosthetic restorations;
- Loss of centric stops as well as vertical occlusal dimension (6).

Currently, the term dental wear is considered a result of four mechanisms:

- Erosion – the result of a chemical process, where erosive potential factors can be of extrinsic or intrinsic origin, and the loss of dental tissue occurs progressively without the presence of bacteria;
- Abrasion – the result of an abnormal mechanical process, not caused by occlusal contacts during masticatory functions;

• Attrition – occurs due to dento-dental contacts during mastication (physiological) or as a result of engaging in parafunctional habits (pathological);
• Abfraction – the result of exaggerated occlusal forces (6).

Aim and objectives

The purpose of this article is to highlight, through a questionnaire, the level of awareness among legal representatives of minor patients regarding their dietary habits, interest in dental hygiene, and the presence of any potential illnesses that may influence the occurrence of dental erosion. Subsequently analyzing a number of patients, we will attempt to observe the changes that occur in the dental structure as a result of the interaction with various intrinsic or extrinsic substances, as well as the etiology of these lesions among children and adolescents.

MATERIAL AND METHODS

For this study, the decision was made to employ the questionnaire method. The objective was to observe the factors leading to the occurrence of dental erosion, as well as the situations that promote the development of this condition.

The questionnaire was addressed to a group of 288 parents but can also be completed by other legal representatives of the children. Before distributing the questionnaire, the consent was requested in order to participate in this conducted study.

The questionnaires were distributed in Timiş County. The questionnaire also included a series of general information regarding the participants like: demographic data that concerned the sex, age and the environment origin (urban/rural).

The questions analyze when was the first visit of the child to the dentist, what was the reason for the visit, how often the child brushes his teeth, if the child uses mouthwash and if the child complains of tooth sensitivity or pain.

The parents were asked if they had heard of dental erosion and if they had been informed by the dentist that this condition is present in their child's teeth.

Other questions analyze whether the child is being administered medication, if the child has been diagnosed with a medical condition, if they consume carbonated beverages, citrus juices, energy drinks, or fruit teas and when and how often he consumes them.

RESULTS

A total of 288 responses were received for the distributed questionnaire. Over the course of several months, 37 patients, along with their legal representatives, presented themselves at the Department of Pedodontics within the Faculty of Dental Medicine. Following the evaluation, it was found that out of those presented, 5 exhibited signs of dental erosion.

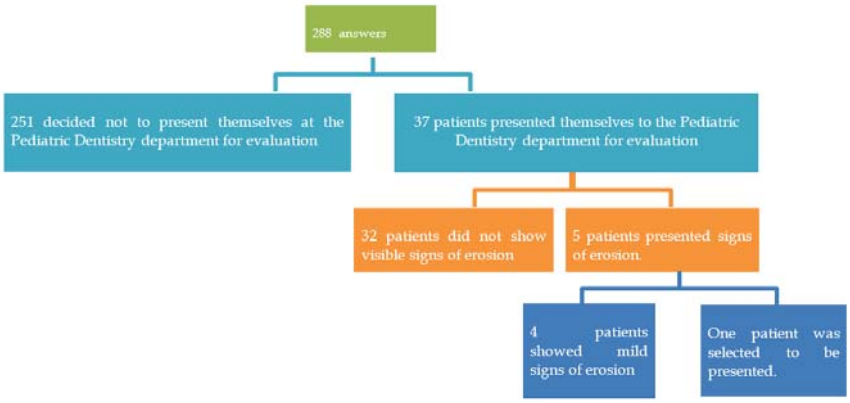

Figure 1. Participation rate and exclusion criteria

Analyzing the responses to the question regarding the first visit to the dentist, it was concluded that out of the total of 288 completed questionnaires, most children were taken to the dentist for the first time by the age of 10. Between 3 and 5 years, there were 133 children (39.2%), between 6 and 10 years, there were 111 children (38.5%), over the age of 11, there were 37 children (12.8%), while the number of children who have never been to the dentist is low, only 27 children (9.4%).

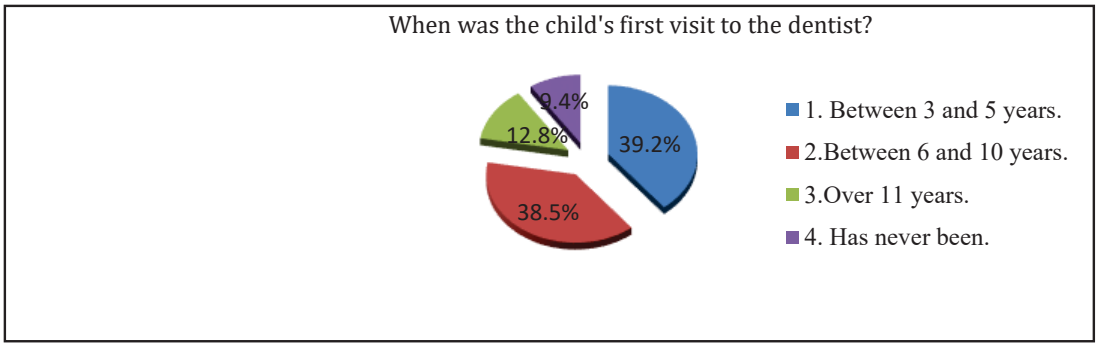

Figure 2. First visit to the dentist

Upon analyzing the responses, it was found that a large number of 236 children (81.9%) consume at least one of the following: carbonated beverages, citrus juices, energy drinks, fruit teas, while only 52 children (18.1%) do not consume the mentioned beverages.

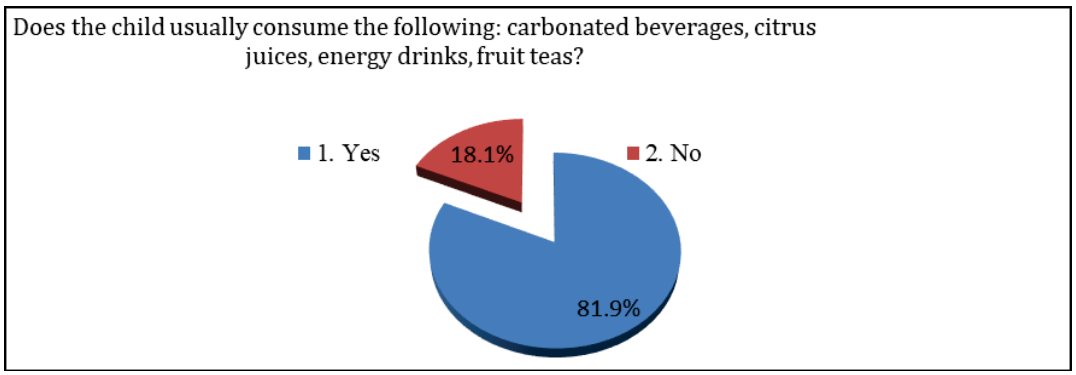

Figure 3. Different beverages consumption

Dividing into two categories the reason for the first visit, we noticed that 158 children (54.9%) were taken to the dentist only for a routine check-up, while a number of 130 children (45.1%) were taken to the dentist only when they experienced pain.

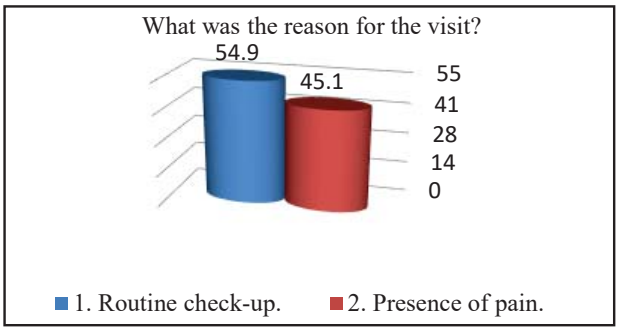

Figure 4. The reason for the visit

Analyzing the responses received, out of the 288 responses, it is evident that: a total of 190 children (66.0%) brush their teeth twice a day, 70 children (24.3%) brush once a day, while only 28 children (9.7%) brush their teeth once every few days.

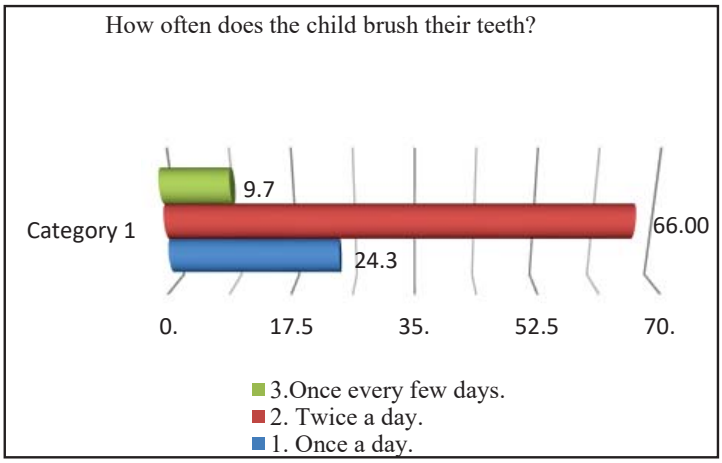

Figure 5. How often does the child brush their teeth

Out of 288 responses received, meaning 288 children, it was found that only 81 children (28.1%) use toothpaste without fluoride, while the larger proportion, representing 207 children (71.9%), use toothpaste with fluoride.

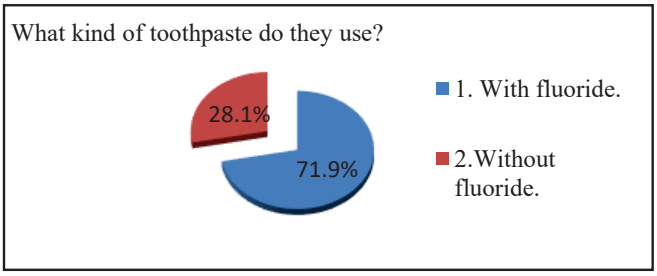

Figure 6. The type of toothpaste used

The responses indicating that children complain of dental sensitivity are relatively fewer than those who do not have this issue. Out of a total of 288 children, 123 belong to the first category (42.7%), while 165 children belong to the second category (57.3%).

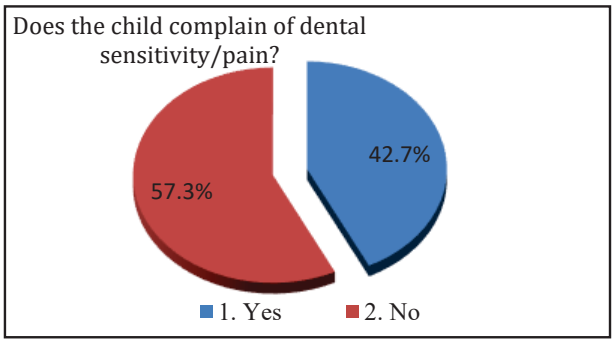

Figure 7. Dental sensitivity complaint

Among those who responded to the questionnaire, 85 legal representatives (29.5%) were informed by the dentist that dental erosion is present in their child's teeth, while 203 legal representatives (70.5%) were not alerted to the presence of the condition in their child.

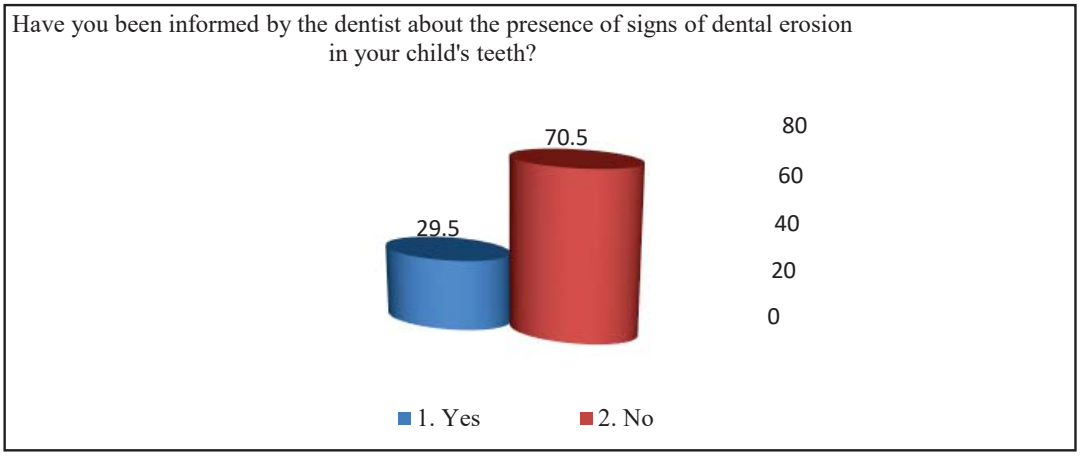

Figure 8. Awareness of dental erosion

Out of a total of 288 children, a number of 168 are not undergoing any medical treatment, representing more than half of the total responses (58.3%). Vitamin C supplements are administered to 55 children (19.1%), treatment for bronchial asthma is taken by a smaller number, only 24 children (8.3%), 13 responses (4.5%) were recorded for antidepressants, and the remaining 28 responses (9.7%) were selected by legal representatives whose children are given iron supplements.

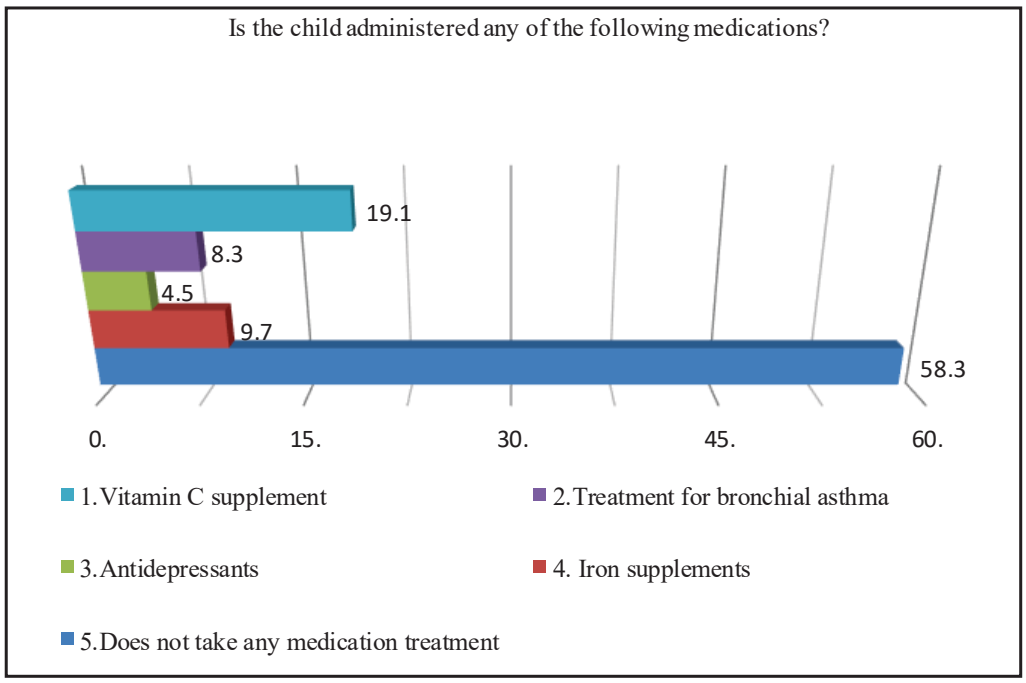

Figure 9. Medication administration among subjects

209 legal representatives (72.6%) stated that their children have not been diagnosed with any condition, while 39 children (13.5%) experience frequent vomiting, and 40 children (13.9%) have been diagnosed with Gastroesophageal Reflux Disease (GERD).

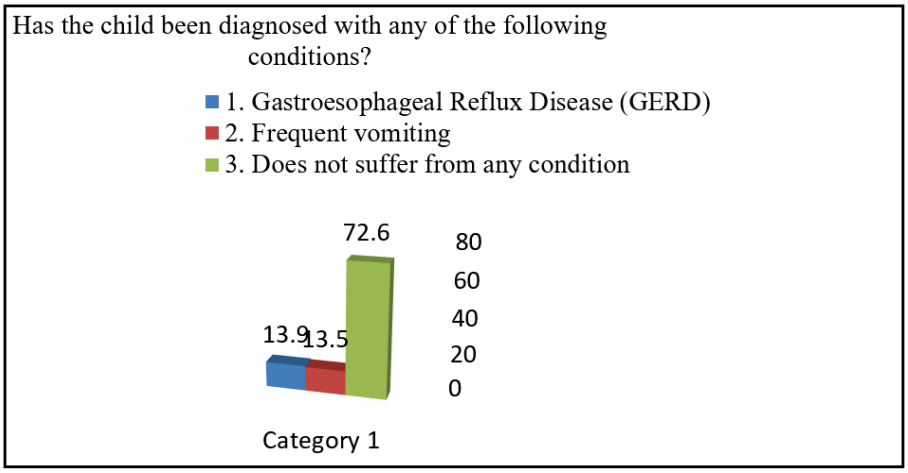

Figure 10. Medical conditions that affect the subjects

DISCUSSIONS

Following the analysis of responses and their interpretation, it was observed that the occurrence of dental erosion is influenced by multiple factors.

Studies have shown that the population with a higher intake of citrus juices and carbonated beverages is more likely to experience dental erosion. The frequency of beverage consumption, the duration of contact between the drink and teeth, and the manner of consuming these beverages are crucial factors (7). Garduno-Picazo MG et al., 2020,

emphasized the importance of informing parents about the risks associated with such drinks to reduce the prevalence of dental erosion, which has negative effects on oral health (8).

In the current study, no positive relationship was found between the timing of food intake and the occurrence of erosion, contrary to the findings of L. Marques Martinez et al., 2019, which associated nighttime consumption of fruit juices with a higher rate of dental erosion (9).

On the other hand, a shared conclusion with the studies of L. Marques Martinez et al., 2019, is that socioeconomic status is among the factors that increase the likelihood of developing dental erosion. The analysis of responses revealed that parents with lower education levels generally come from rural areas, situations where the number of children in the family is higher, the first visit to the dentist occurs when pain arises, and awareness of dental erosion is directly proportional to the parents' level of education (9).

Another observed factor is the difference between patients with certain conditions such as Gastroesophageal Reflux Disease (GERD), frequent vomiting, bronchial asthma, and those without any health issues. The analysis showed that patients with certain conditions are more prone to dental sensitivity and dental erosion. This finding aligns with other studies conducted by Ulla Moberg Sköld et al., 2022, and L. Marques Martinez et al., 2019, which demonstrated an association between dental erosion and medications for certain conditions (9,10).

In the case of patients with bronchial asthma, bronchodilators induce the relaxation of smooth muscles, which could lead to significant relaxation of other smooth muscles, including the lower esophageal sphincter. This relaxation causes disturbances, leading to gastric reflux, a recognized significant cause of dental erosion (10).

Ulla Moberg Sköld et al., 2022, suggests that asthma medications, with a pH of approximately 5.5, and sweeteners in inhaled medications can be predisposing factors, as important as the child's lifestyle and dietary habits (11).

The study concludes that conditions like Gastroesophageal Reflux Disease (GERD) and frequent vomiting contribute to the occurrence of dental erosion, acting as intrinsic factors. In the received responses, children with any health condition, including GERD and frequent vomiting, are more prone to dental sensitivity. This result aligns with the research conducted by Meenakshi Ganesh et al., 2016, which showed that the acidity and lower pH of gastric juice increased the prevalence of dental erosion (12).

It is important to note, considering research on the prevalence of erosion among the population, that deciduous dentition is much more vulnerable to dental erosion. This vulnerability is due to the thinner enamel layer compared to permanent dentition. In the case of deciduous dentition, enamel is affected in the majority of cases (>80%), dentin between 21% and 48%, and dental pulp is extremely rarely affected. Lesions are mostly localized on the maxillary incisors, followed by the occlusal surfaces of molars (13).

It is crucial to emphasize that the presence of erosion is not determined by gender, whether discussing deciduous or permanent dentition. The prevalence of this pathology primarily depends on the dietary and behavioral habits of the respective population, making anyone susceptible to its undesirable effects (13).

Therefore, early diagnosis, correct intervention, and prevention are key factors in minimizing the factors that lead to the occurrence of dental erosion.

CONCLUSIONS

As a result of the research conducted on the chosen topic through consulting specialized literature and numerous studies, the following findings have been identified:

- Dental erosion is not prevalent in a significant number of children and adolescents in our analyzed group.
- The primary cause of dental erosion is associated with Gastroesophageal Reflux Disease (GERD), frequent vomiting, and other gastric disorders affecting the esophageal sphincter, leading to the entry of gastric acid into the oral cavity.
- Children undergoing medication treatment more frequently experience dental sensitivity.
- Diet is also an indicator of risk in the occurrence of dental erosion, especially with the consumption of acidic beverages and citrus juices, and dental sensitivity becomes more prevalent with advancing age.
- Parents who take their children to the dentist earlier tend to have higher levels of education. The primary reason for their visits is routine check-ups, and they are more knowledgeable about dental erosion.
- Given the limited number of legal representatives who are aware of dental erosion, redirecting attention to informing parents about this condition is of great importance. It is crucial to present the factors contributing to the occurrence of dental erosion and the means of preventing it.

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