THE FLUORIDE AS ENVIRONMENTAL FACTOR WITH INFLUENCE OVER THE DENTAL STRUCTURE

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Abstract

The halogen fluoride is well distributed throughout the Earth and never occurs in a free state in Nature. Fluorine exists only in combination with other elements as fluoride compounds, which are constituents of minerals in rocks and soil. Fluoride accumulates in the hard tissues of the body and is known to play an important role in the mineralization of bones and teeth

While fluoride is accepted as an effective method to prevent caries, the excessive consumption of fluoride can put bones and teeth at risk of developing fluorosi. My main objective is to identify, from the earliest stages, the abnormalities in the dental system of the children and adolescents who study in the schools of Bihor County.

Key words: enamel fluorosis, oral health, schoolchildren

INTRODUCTION

Oral tissues, such as the gingiva, teeth, and muscles of mastication, are living tissues, and they have the same nutritional requirements as any other living tissue in the body.

When adequate, nutritious food is not available, oral health may be compromised by nutrient-deficiency diseases. . In contrast, when food is freely available, as in many industrialized societies, oral health may be compromised by both the continual exposure of the oral environment to food and the presence of chronic diseases.

Policies pursued by different countries to use these vehicles for addressing public health problems vary, depending on the disease burden, health priorities, political philosophy, economic situation, health care system, and feasibility. While fortification of cereals and grains with folic acid has been mandated in the United States since 1996, many European countries have been slow to adopt this (Oakley GP Jr, 2002).

Similarly, policies regarding the selection of fluoride as a preventive modality vary widely across different countries.For example, Vietnam has recently undertaken efforts to promote fluoridation, whereas it has been discontinued in the former East Germany.

While Switzerland and some South American countries have promoted salt fluoridation. The effect of fluoride is considered primarily, though not exclusively, post-eruptive(CDC, 2001).

A narrowing in the difference in caries rates between fluoridated and non-fluoridated communities has been observed. Many other forms of fluorides are now available, especially fluoride toothpastes in developed countries. Almost 20% of 2- to 5-year-old children experience caries.

Among 16- to 19-year-old children, the average number of decayed, missing, and filled surfaces is 5.8. (DMFS). Only about 50% of children visit a dentist annually. In general, the disease burden is higher among the poor and minorities. This assumes greater importance when one considers that one in four children in the United States lives in poverty. In the early part of the last century, dental caries was considered a disease of the rich, due in part to their greater access to refined sugar.(CDC, 2001)

The use of fluorine compounds in various areas of medicine, particularly in dentistry, as well as in agriculture and industry became very popular in the second half of the 20th century. Fluorine owed this widespread acceptance to observations that its compounds stimulate ossification processes and reduce the prevalence of caries. Unfortunately, growing expectations overshadowed the truth regarding interactions of fluoride on the molecular level.

The fact was often ignored that fluoride is toxic, even though laboratory data stood for a careful approach to the benefits of usage. Excessive exposure to fluoride may lead to acute poisoning, hyperemia, cerebral edema, and degeneration of the liver and kidneys. Acute intoxication through the airways produces coughing, choking, and chills, followed by fever and pulmonary edema.

Concentrated solutions of fluorine compounds produce difficult to heal necrotic lesions. In spite of these dramatic symptoms, acute intoxications are relatively rare; the more common finding is chronic intoxication attributable to the universal presence of fluorine compounds in the environment.

The first noticeable signs of excessive exposure to fluoride in contaminated water, air, and food products include discolorations of the enamel. Dental fluorosis during tooth growth and loss of dentition in adulthood are two consequences of chronic intoxication with fluorine compounds. approaches, such as health education efforts to bring about changes in individual behavior and dietary control, have not shown impressive results(Kay EJ, 1996).

While fluoride is accepted as an effective method to prevent caries, the excessive consumption of fluoride can put bones and teeth at risk of developing fluorosis (Fomon SJ, et al, 2000) Fluoride ingested during dental

development, until the age of six years, may promote the development of fluorosis.

Fluorosis is viewed as primarily affecting permanent dentition, and very high fluoride levels (>10 ppm) are required in drinking water for the fluoride to cross the placental barrier and affect primary dentition.

Multiple mechanisms, including direct fluoride-related effects on ameloblasts (secretory and maturation phases), indirect fluoride-related effects on the forming matrix (nucleation and crystal growth in all stages of enamel formation), and calcium homeostasis, can result in dental fluorosis depending on the dose and duration of fluoride exposure (Bronckers AL, et al, 2009).

The first noticeable signs of excessive exposure to fluoride in contaminated water, air, and food products include discolorations of the enamel. Dental fluorosis during tooth growth and loss of dentition in adulthood are two consequences of chronic intoxication with fluorine compounds. Abnormalities in mineralization processes affect by and large the osteoarticular system and are associated with changes in the density and structure of the bone presenting as irregular mineralization of the osteoid.

In clinical terms, dental fluorosis may result in varying degrees of structural damage, superficial porosity, and loss of continuity of the dental enamel layer (E María Dolores, et al, 2011).

Dental fluorosis may be more than a cosmetic defect if enough fluorotic enamel is fractured and lost, causing pain, adversely affecting food choices, compromising chewing efficiency, and requiring complex dental treatment. Chronic poisoning by fluoride consumption is a global public health issue that is principally observed in areas with above-optimal fluoride levels in the drinking water (E María Dolores, et al, 2011)

The adverse effect of excessive exposure to fluoride is dental fluorosis, which is a permanent hypomineralization in the subsurface of enamel, characterized in its mildest form by small, clearly visible, white flecks found on the cusp tips and on facial surfaces of permanent dentition. Fluorosis is mostly found on permanent teeth surfaces ranging from obvious white opaque areas (moderate form) to darkly stained and pitted enamel (severe form). (Den Besten, 1999)

It is frequently claimed that it is very difficult to discriminate between dental fluorosis and other enamel disturbances. It can occur in in the primary dentition but is confined to the permanent dentition. (Declan Millet, Richard Welbury-Orthodontics and Pediatric Dentistry, 2005)

My main objective is to identify, from the earliest stages, the abnormalities in the dental system of the children and adolescents who study in the schools of Bihor County, in order to inform them and their

parents of the necessity of instituting some correct and complete therapeutic measures.

MATERIAL AND METHOD

My research consists of a prospective, controlled and randomized study.

The subjects I examine make up the material of my research. A representative sample of 2000 children and adolescents who follow the gymnasium and high school classes in the schools of Bihor County stand as subjects of my study. I shall examine children and adolescents from both urban and rural environment. My purpose is to identify those who show abnormalities of the permanent dentition, isolated or by being part of some syndromes.

After a directed brushing, an intra-oral examination was performed in daylight, using plane mirrors and dental probes with rounded tips. The subjects' teeth were dried with sterile cotton for better visibility before the examination.

A questionnaire was delivered to the parents of each child included in the study. The questions were previously evaluated with regard to feasibility and reliability through a pilot study administered to 50 persons. We collected the following data: age at which the children began brushing, how many times they brushed their teeth each day; the type of toothpaste used (fluoridated or non-fluoridated); the amount of toothpaste applied to the toothbrush; the use of products containing fluoride, such as mouth rinses, drops, tablets, gels, or solutions.

I managed to examine until now 171 children and adolescents in the dental medical offices belonging to the schools where they study, making use of the exploration instruments specific to dental medicine.

The patients identified as suffering by a form or another of dental abnormality have been directed to my dental medical office for a detailed examination, of course, in the cases in which both children and parents agreed with the further steps of the investigation.

For each patient has been made a detailed anamnesis and where I considered it necessary, I asked for the presence of one of the parents, preferably the patient's mother.

I passed to the clinic examination of each patient who presented one or another form of dental abnormality.

The patients experienced specific investigations, dental retroalveolar x-rays and panoramic x-rays. The completing and, especially, the elucidation of a diagnose implies, many times, the performance of a particular radiologic exam.

The dental radiology is of a real help in diagnosing the dental abnormalities present in children and adolescents, in many cases the radiologic detections bringing important information necessary for a correct and complete therapeutic attitude. However, the risks regarding the patients' exposure to x-rays shouldn't to be neglected and is necessary to evaluate the patients for whom a radiologic examination brings a real and indispensable benefit.

After accomplishing all the necessary investigations, it was issued a correct, complete, etiopathogenetic and clinic diagnose.

The next step was to completely inform the patients, children and adolescents, over the abnormality or dental abnormalities, associated or not, of which they suffer. I acted in the same manner with their families, assuring myself that they will be aware of the dental abnormalities of which their children suffer. The other step to follow is the treatment which is different for each type of abnormality.

RESULTS AND DISSCUSIONS

It has been done a mathematical-statistical analysis, and as a result, from the total of 171 examined students(girls and boys) in the dental medical offices from the schools in which they study, 56 of them show dental abnormalities (32,08%).

The group range taken into consideration was that of 13 to 18 years old, being part of the study only the abnormalities present at the permanent teeth.

From those 56 students identified with dental abnormalities, 44 of them show dental abnormalities of position (78,56%), 3 of them show dental abnormalities of number (5,35%), 3 show dental abnormalities of size (5.35%), 2 show dental abnormalities of structure (3.56%) and 4 show ectopic eruptions (7,14%). (table 1)

Table 1

DENTAL ANOMALIES IDENTIFIED IN SCHOOLCHILDREN

TYPE OF DENTAL ANOMALIES	NO OF SUBJECTS WITH DENTAL ANOMALIES	
ANOM. OF POSITION	44	78,56%
ANOM OF NUMBER	3	5,35
ANOM. OF SIZE	3	5,35%
ANOM OF STRUCTURE	2	2%
ANOM. OF ERUPTION	4	7,14%

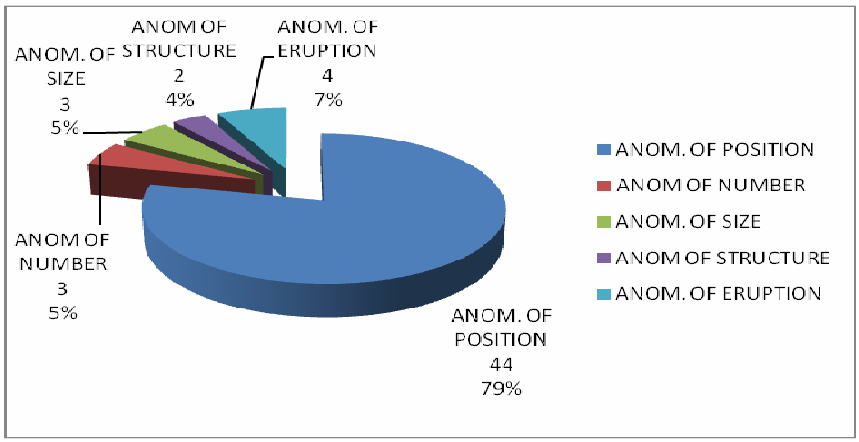

Fig. 1 The chart for dental anomalies identified in schoolchildren

In the preliminary screening, a total of 171 subjects fitted the inclusion criteria and 2 of these were determined as having dental fluorosis (fluorosis group), while 169 of them had a non-fluorosis dentition.


Fig. 2 Enamel flourosis

The concentration of fluoride in toothpaste varies from country to country in accord with government regulations which makes studies hard to compare. The U.S. Food and Drug Administration (F.D.A.) allows dentifrices containing 850 to 1150 ppm total fluoride for children age two and up and 1500 ppm fluoride for age six and up. However, consumers and health providers often do not understand the distinction.

It is necessary to reconsider the role of other variables, such as nutritional status and total ingestion and excretion of fluoride, to develop the optimal dose of fluoride that is suited to patients' needs. Additionally, other environmental and geographical factors should be evaluated, such as

geographical location, weather and altitude. The study will continue and will count up to 2000 students from the schools of Bihor County.

CONCLUSIONS

I consider the investigation of children and adolescents from the schools of West side Romania appropriate, because, taking into consideration the number of 56 abnormalities identified until now, in the future I will be able to early detect any form of dental abnormality. In conclusions, the use of fluoride, particularly by dentists and pediatricians, must be controlled and adapted to individual needs. The impact of interventions to control dental caries is difficult, because it is characterized by a complex interaction of multiple risk factors. Documenting the impact of fluoridation is even more challenging, because the immediate impact is not apparent. Therefore, research should continue to asses its impact and to determine the appropriate level of fluoride in water to balance the benefits of fluoride against the risks of enamel fluorosis in any one country.

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