University of Medicine and Pharmacy "Gr T. Popa" Iasi
Faculty of Dentistry

THESIS

EPIDEMIOLOGICAL, ETIOPATHOGENIC AND CLINICAL
STUDY OF DEVELOPMENTAL ENAMEL DEFECTS IN
CHILDREN AND ADOLESCENTS

SUMMARY

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CUPRINS

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Abreviations

TT – temporary teeth
PT – permanent teeth
M1P – first permanent molar
M2P – second permanent molar
DDE – developmental defects of enamel
DDE – index of developmental defects of enamel
DDEM – modified index of developmental defects of enamel
SCOTS – SCOTS index of developmental defects of enamel
EDS – gravity index of developmental defects of enamel
Odem – demarcated opacity
Odif – diffuse opacity
H – hypoplasia
D – dyschromia
WCO – white-cream opacity
YBO – yellow-brown opacity
HP – hypoplasia pits
HGH – horizontal grooves hypoplasia
VGH – vertical grooves hypoplasia
MEH – missing enamel hypoplasia
MS – measles
M – mumps
WC – whooping cough
PVI – persistent viral diseases of upper respiratory tract
ND – neurological diseases
A – allergy
DD – dermatological diseases
PA – planned admissions
AD – acute diseases
CD – chronic diseases
OM – otitis
AB – asthma bronchic
OI – other infections
TTT – trauma of temporary teeth
ADJ – dento-enamel junction
INTRODUCTION

Dental developmental disorders are generally rare diseases linked to developmental stage-specific biological processes and the origin odontogenezei embryological cell development area dental, tooth type and morphogenesis.

Extending the period of formative dental organ during a long stage, offers wide possibilities for intervention extremely varied etiological factors, hereditary, congenital, acquired, which justified the end, as great a variety of clinical forms, psychological and functional impact sometimes very badly on the patient.

Knowledge of the etiology of morphological abnormalities can lead to the identification of developmental processes involved in the expression of normality. The process goes in reverse, understanding the genetic mechanisms and biology of dental development will enable the processes involved in the formation of specific abnormalities. Enamel development defects (DDS) Dental problems appear isolated or as specific lesions - associated with other clinical manifestations in some syndromes (1-3).

The severity of lesions requires systematic studies we form a better picture of the size and characteristics of disease correlations with the establishment of predictive value of various potential risk factors. Early diagnosis is important in terms of establishing a long-term prognosis. Treatment with various medicinal substances during pregnancy and breastfeeding is a risk factor for both mother and fetus. The benefit of this therapy is being developed constantly in balance with the risks being put on the child. There are few medicines known to disrupt the formation of dental hard tissue, but in recent years studies have appeared that question the use of antibiotics considered safe by associating with molar incisor hypomineralisation-like lesions or fluorosis affecting mineralization of organic matrix in the first years of life. Research carried out on experimental animals suggest side effects of drug compound widely used in human pathology, consisting of structural changes of S.

DDE has emerged as a public health issue after he noticed an increase in their prevalence in the world, even if it increased the severity of injuries. Most lesions were not observed in practice associated with pain or sensitivity, their consequences are often subjective. Thus, these dental abnormalities can cause widespread effects not only the prevalence and severity, but the aesthetic perception that determines its impact. In light of the above in the context DDE dental dystrophies form a vast,
varied and complex, warranting attention in the literature and the study conducted in urban pediatric population Iasi current data can be obtained knowing the degree and type of dental damage, potential risk factors and their impact on quality of life of children in the age group 5-18 years, which is a necessary step for future preventive studies.

Developing the thesis, and steps that have preceded it - preparing essays, exams, publishing articles in the topic sentence, were conducted with the support and under the guidance of scientific leader, Prof. dr. Adam Maxim, which I bring respectful thanks.

I would like to thank doctoral committee members for reading and referenciating this thesis.

I would also like to express thanks to those who have supported me in pre-development work and documentation stages in processing clinical data – Conf. Dr. Marinela Păsăreanu, Prof. Dr. Irina Căruntu and faculty members of the Faculty of Veterinary Medicine and Department of Animal Science, University of Agricultural Sciences and Veterinary Medicine "Ion Ionescu de la Brad" Iasi which made possible the achievement of the practical part of the work: Prof. Dr. Octavian Zaharia Oprean, Prof. cons. Cornelius V. Cote, Prof. Valentin Nastasă, Conf. Dr. Maciuc Dr. Vasile.
CHAPTER I

EPIDEMIOLOGICAL SURVEY METHODOLOGY

Epidemiological data on dental health is a starting point for monitoring and evaluation of DDE, in this age group 5-18 years old the choice of covering the entire period of eruption of permanent teeth and their functional early stages when clinical changes can be observed. Dental health is directly influenced by a number of factors seemingly harmful or even beneficial in small doses, but can lead to structural changes of the enamel beyond certain limits.

Epidemiological survey was used to collect information needed to assess oro-dental health status and psychosocial perception of a pediatric population in Iasi city and guards.

To achieve a proper investigation into school communities studied, we followed the following steps according to World Health Organization algorithm, proposed in 1998.

Study objectives:
- establishment of epidemiological features of enamel defects in permanent dentația communities studied: the prevalence of research using the DDE index, modified DDE, SCOTS index
- correlation of results with some factors that could constitute risk factors for their occurrence;
- correlation between enamel defects and antibiotics administered during the first four years of life;
- pathognomonic clinical research aspects of medical practice;
- histological investigation of enamel defects form individualized clinical animal study of effects of amoxicillin.

I performed a bibliographic documentation in consultation with a number of books, articles in the University Library of Medicine and Pharmacy, “GR.T Popa” Iași, databases (Medline, EBSCO, NCBI) with modern methods (Internet).

Data collection methodology
Stage is the most laborious investigation protocol as described whole way of carrying out actions in the field, choose the group or sample tested. Database selection, examination and evaluation of 1006 cases have
made in urban areas – Iași and Târgu Frumos of which 334 children were from urban areas with average socio-economic status - school "Ion Ghica" of Iași in school-years 2007-2009 and 672 school-children in urban areas with low socioeconomic status - Placement centers in Iași and Târgu Frumos in 2009-2010. It was necessary to obtain consent to conduct research education institutions and teacher support for this study. Not included in the study were children who did not receive consent from parents / guardians and have signed consent form knowingly informed and empowered.

The examination was conducted in six stages:
1. Information has been a teacher of children and the work to be done, the importance of oral health education, describing briefly the main issues are tracked to identify DDS.
2. Esthetic perception assessment was made of the child, parents and dentist with the questionnaire by the parents, then children were divided into two images standardized dental arch front and one with "happy tooth" who asked the coloring according to their own opinion across the ideal appearance of their teeth and child perception of a "happy tooth". Children were asked drawings available with aesthetic ideal self-portrait for refining the analysis of children.
3. It has made clinical examination and photography.
4. Permanent teeth were evaluated (PT) on DDE.
5. Photographs were examined by your dentist to assess its aesthetic perception vis-à-vis of children's dental appearance.
6. Revaluation cases with DDE was performed in dentist's office. Its were completed pediatric clinical observation sheets (sheets WHO) in the school year (2007-2008) (2008-2009) (2009-2010). They made the centralization of obtained data.

The sample selection includes a protocol developed over several phases: the sample consists of all children enrolled in school "Ion Ghica" in Iași between 2007-2009 and children in Placement centers in Iași and Târgu Frumos in 2009-2010. Its were excluded from the study children who are enrolled but have not been presented during the year, those who have moved or changed their residence during the year.

The sample will be higher, the prevalence estimates will be correct. In the case of rare diseases, such as our case, you will need a sufficiently spread sample number compared to the situation of common diseases for which the sample may be limited to a representative position. Our sample includes 1006 children aged 5 -18 years.
Questioning a smaller number of persons than those provided in the sample or uneven filling of investigation records can produce errors in processing and interpreting statistical data. Whatever the objective, it is important that at least 80% of people in the sample to be investigated properly to reduce gaps in information collection. In our case only a percentage of 18.4% have completed questionnaires.

**Methodology of investigations**

The investigation was supported by a single dentist and a nurse. Documentation to establish the parameters of investigated cases was conducted by examining doctor - knowing indices DDE, modified DDE and SCOTS.

**The methodology of data collection by questionnaire sheet**

Data were collected from companions (parents, caregivers). I designed a questionnaire sheet so that questions are clear, well formulated and directly correlated with the objectives of the investigation suggest not answer, was given a limited time of their completion by parents (10-20 minutes).

**Ethical implications of research**

Obtaining the opinion of "free consent" to participate in the study of people surveyed, confidentiality, using the results determined in accordance with ethics committees, are as important as the elements described above. Research activities were conducted in accordance with existing legislation in force, respecting ethical norms of research. Stages of clinical observations were conducted in agreement with Law no. 46 of 21 January 2003 on patient rights, after agreement to participate in scientific research. We respected privacy of patients. Approval for the study was provided by the Directorate of Social Assistance and Child Welfare Iaşi and Director of School "Ion Ghica". And informed consent was obtained mandated in writing and signed by parents / caregivers through questionnaires sent explaining the study purpose.

**Investigation team**

Epidemiological investigations should not be omitted from the team epidemiologists, general clinicians, qualified nursing staff and statisticians. The team consisted of: dentist, nurse, epidemiologist, histologist, veterinarian, statistician.
Schedule for conducting the study phases
Every year at the end of school I collected the data necessary during three days required clinical examination and photography of children. Later cases were reviewed by DDE in the dental office. Histological examination was performed where permanent teeth were removed unrecoverable, which was established using a single antibiotic - amoxicillin in age from 1-4 years. Animal study was conducted by processing data from the clinical study and thorough documentation in the literature.

Processing and evaluation of statistical and mathematical information
Was performed after data collection, using software programs - Microsoft Excel, Picture Manger, to ensure their character information. Actions include the phase ordering process, systematize, and reduce the amount of information collected by successive operations of grouping, sorting, coding and synthesis. I corrected collection or coding errors, we synthesized results using tables, we have reduced the amount of information, I realized the database. Data were entered into SPSS software for analysis.

Interpretation and transmission of information
The results are summarized and detailed form of tables, graphs, histograms, charts.

Processing and interpretation of data - statistical methods
The data were loaded and processed using statistical functions of EpiInfo, Excel and SPSS.
Statistical processing of used two programs: SPSS 16.00 for Windows.
Student test used in statistical analysis to compare the average of two population characteristics. Calculate the value of probability p. Materiality is generally accepted that 95% p = 0.05 (CI95%). The value of p is less than this value is much greater significance.

χ² test is a non-parametric test that compares two or more frequency distributions from the same population, is applied when the expected events are excluded. The relative risk (RR) is the ratio of the incidence of diseases within the same disease in exposed and uninjured.
CHAPTER II

EPIDEMIOLOGY OF PERMANENT TEETH DEVELOPMENTAL ENAMEL DEFECTS

Extending the period of formative dental organ during a long stage, offers wide possibilities for intervention extremely varied etiological factors, hereditary, congenital, acquired, which justified the end, as great a variety of clinical forms, psychological and functional impact sometimes very badly on the patient.

II.1. STUDY PURPOSE

The objectives of the study was to determine the epidemiological features of the DDS in permanent teeth of school community in Iasi county - Iaşi and Târgu Frumos city, DDE prevalence and spread in communities with medium and low socio-economic status.

II.2. MATERIAL AND METHODS

The study group comprised 1006 children from urban areas – Iaşi and Târgu Frumos, of which 334 children were from urban areas with average socio-economic status - school "Ion Ghica" Iaşi - school year 2007-2009 and 672 children from urban areas with low socio-economic status - Placement centers in Iaşi and Târgu Frumos in 2009-2010. The study group was divided into two groups according to economic status.

Group "Ion Ghica" includes 334 children: 164 boys and 170 girls, from urban areas, with chronological age between 6-16 years. Group "Placement" includes a number of 672 children: 377 boys and 295 girls, from urban areas, with chronological age between 5-18 years.

Sampling

Reported to population of Iaşi (n = 308 663 inhabitants) (4), with a sampling error of ± 5.35% vs. CI95%, the 334 patients in group "Ion Ghica" include 1.12% 0 of the population of sex male and female 1.05% 0 of the city. Reported to Iaşi county urban population (n = 386 755 inhabitants) (4), with a sampling error of ± 3.78% vs. CI95%, the 672 children in the group "Placement" comprise 2.05%0 of male population and 1.45% 0 of the female population - the urban county.

Clinical examination

Before beginning this study of children's parents and teachers were informed of its purpose and were knowingly consent mandate and informed, written and signed. It was necessary to obtain consent to conduct
research education institutions and teacher support for this study. Not included in the study were children who did not receive consent from parents / guardians and have signed consent form. Were completed Pediatric clinical observation sheets (sheets WHO) in school year 2007-2010.

The children were evaluated in natural light without drying or washing prior to teeth. Ideally, teeth should be dry at the time of examination, cleaning deposits pigment and soft as the real surface of the tooth exposed so you can see hidden defects that can escape from a routine clinical examination. Clinical examination was performed by one dentist (MRM) with current dental instruments (probe, forceps, dental mirror), with detailed examination of the affected areas. Natural or artificial light was used according to the examination requirements. Tooth surfaces were visually inspected, and the suspects were explored with the probe to determine the contours and surface defects (5,6).

Diagnosis was made by comparison with standard images after the examiner was familiar with such defects as defined by the authors in reference photos (7).

Complementary explorations clinical examination consisted of photographic examination (Canon G9 camera). For data classification indices were used DDE (5), DDE modified screening tests (8), EDS score (9,8,10) and SCOTS index (11,12). We used several indicators to compare the results with those from literature specialty.

Enamel defects Development Index - DDE (FDI 1982)

Descriptive classification allows increased flexibility in recording personal data, dental and associated lesions (7).

Number and demarcation defects: Single - well-differentiated appearance of enamel adjacent to normal. A single lesion is visible on the surface of the tooth; Multiple - appear more clearly differentiated enamel lesions adjacent to normal; Diffuse - appearance of white lines, fine, distinct pattern following perikymates lines opacities, sometimes adjacent lines may be confluent; Diffuse patchy - areas of irregular opacities, diffuse, lacking well-defined edges.

Buccal and lingual surfaces of anterior teeth were arbitrarily divided into two halves: half adjacent to the gum and a half edge adjacent incision. Posterior teeth (molars and premolars) presents additional occlusal surface, which starts at the top of cusps. Cuspid area refers only to the tips of cusps.
Modified DDE index (index of enamel development defects changed)

Clarkson and O'Mullane (1989) have proposed an alternative for epidemiological studies for simple screening studies (8). Defect extension derived from summing all the areas affected by the defect in the affected area and report the entire tooth surface.

Enamel defects index change and development of enamel defects score (EDS-Enamel defect score)

A modified version of the DDE index was used in the study by Li and Navia in China (1995) and Agarwal et al. in India (2003) by defining score affected enamel (Enamel defects EDS-score): opacity, hypoplasia pits, vertical linear hypoplasia, horizontal linear hypoplasia, hypoplasia with absent enamel and to assign a single score deficient enamel (EDS) (9, 10).

Index of enamel development defects amended version SCOTS

There was no upper incisors on four of their prior drying (smaller then 2mm anomalies were excluded) demarcated opacity, opacity white / cream or yellow / brown opacity diffuse hypoplasia, demarcated or diffuse opacities, demarcated opacities and hypoplasia, diffuse opacities and hypoplasia, other (defects that are not classified in codes 1-6, all defects demarcated, diffuse hypoplasia (code 1+2 3), excluded (absence or presence of teeth that can not be examined). extension defect was considered for each tooth: less than one third of the tooth, between 1/3-2/3 of the tooth, at least two thirds of the tooth (11,12).

Symmetry of lesions was calculated for all types of defects: asymmetric, symmetric and one defect type, symmetrical defects and several types.

Data were processed using statistical functions of EpiInfo, Excel (Microsoft Office) and SPSS 16 Statistics 8 using non-parametric test of materiality $\chi^2$ with generally accepted 95%, $p <0.05$.

II.3. RESULTS

Group "Ion Ghica"

The highest percentage of children in the study group can be found at the age of 8 years (17.1%). Depending on the presence of DDE, group was divided into two sublots, to carry out the terms of a comparison:
Group with DDE - 42 children (12.57%); Group without DDE - 292 children without DDE (87.43%).

DDE index

1. Types of defects

The results of this study show that DDS was identified in 42 children (12.57% of cases), 7 of them (2.1%) showing the teeth both opacity and hypoplasia or dyschromia (tab. 1). Reported to number of teeth corresponding to the 42 cases (n = 912), opacities occurred in 82 teeth (8.99%), hypoplasia 17 teeth (1.86%), dyschromia at two teeth (0.32%).

<table>
<thead>
<tr>
<th>DDS</th>
<th>Copii</th>
<th>Dinți</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nr.</td>
<td>%</td>
</tr>
<tr>
<td>Opacity</td>
<td>40</td>
<td>11,97</td>
</tr>
<tr>
<td>White-cream</td>
<td>40</td>
<td>11,9</td>
</tr>
<tr>
<td>Yellow-brown</td>
<td>3</td>
<td>0,89</td>
</tr>
<tr>
<td>Hypoplasia</td>
<td>9</td>
<td>2,69</td>
</tr>
<tr>
<td>Pits</td>
<td>5</td>
<td>1,49</td>
</tr>
<tr>
<td>Horizontal grooves</td>
<td>3</td>
<td>0,89</td>
</tr>
<tr>
<td>Vertical grooves</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Absent enamel</td>
<td>1</td>
<td>0,29</td>
</tr>
<tr>
<td>Dyschromia</td>
<td>2</td>
<td>0,59</td>
</tr>
</tbody>
</table>

Maxillary incisors presented the highest degree of damage 6.79%, 1.75% followed by premolars, canines and molars with 1.31% 0.65% (fig. 1). DDE were more prevalent on the buccal surfaces of teeth. No statistically significant differences recorded between the opacity distribution to maxilla and mandible ($\chi^2 = 0.12$, GL = 1, $p = 0.727$).

![Fig. 1. DDE Teeth distribution depending on the dental type and location](image-url)
Creamy white opacity affecting the maxillary central incisors most commonly \( (n = 32) \) 3.5\% and 7.89\% of maxillary anterior teeth \( (n = 72) \) affected by DDS opacities \( (n = 57) \) is 6.25\%.

Distribution of PT with hypoplasia, depending on the type of defect shows statistically significant differences between liniary hypoplasia and absent enamel hypoplasia \( (\chi^2 = 9.0; \ GL = 1, \ p = 0.003) \).

The casuistry studied associations between different types of DDS showed no significant differences.

2. Number and demarcation of defects

Of 102 teeth with lesions, maxilla presented - single lesions - left upper central incisor 14.7\%, multiple lesions - upper right central incisor and the upper right lateral incisor 0.98\%. Diffuse-patchy lesions - upper lateral incisor right and left upper central incisor by 6.86\% (fig. 2). Mandibular lesions are much less present: single lesions - right lateral incisor, left first premolar 1.96\%, multiple lesions - lesions diffuse-patchy - left lateral incisor 1.96\% (fig. 3).

![Fig. 2. Number and demarcarcation of the maxillary DDE](image)

![Fig. 3. Number and demarcarcation of the mandibular DDE](image)
Distribution of single lesions are prevalent maxillary teeth, followed by maxillary diffuse, mandibular linear diffuse lesions are absent.

**3. Defect location**

Most defects have been expanding over the tooth surface and half surface incision involved. Were not affected in any tooth enamel and not all were recorded lesions on the lower central incisors of the gingival half left.

**Modified DDE index**

**1. Types of defects**

DDE index was used in recent years several studies of prevalence of DDE.

DDS resulting prevalence was: 11.97% opacities, hypoplasia and dyschromia 2.69% 0.59% (tab 2).

DDS of 42 children, 24 showed only diffuse opacity and 10 (23.8%) had both teeth opacity and hypoplasia or dyschromia. Of the 912 teeth corresponding to the 42 cases were registered: opacities - 82 teeth (8.99%), hypoplasia - 17 teeth (1.86%), dyschromia - 3 teeth (0.32%).

**TABLE 2. DDE case distribution**

<table>
<thead>
<tr>
<th>DDE</th>
<th>children</th>
<th>teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nr.</td>
<td>%</td>
</tr>
<tr>
<td>Opacity</td>
<td>40</td>
<td>11.97</td>
</tr>
<tr>
<td>Demarcated</td>
<td>12</td>
<td>3.59</td>
</tr>
<tr>
<td>Diffuse</td>
<td>33</td>
<td>9.88</td>
</tr>
<tr>
<td>Hypoplasia</td>
<td>9</td>
<td>2.69</td>
</tr>
<tr>
<td>Dyschromia</td>
<td>2</td>
<td>0.59</td>
</tr>
</tbody>
</table>

Statisticaly, there is no difference between the distribution of the maxilla and mandible opacity ($\chi^2 = 0.17$, GL = 1, p = 0.684).

Diffuse opacity affecting the maxillary central incisors most commonly 2.63% and from 7.89% (n = 72) maxillary anterior teeth affected by DDE opacities (n = 57) is 6.25%.

The casuistry studied associations between different types of DDE did not show significant differences.

**2. Defect extension**

It was noted that of all affected teeth (n = 102) 46.1% have a defect extension less than 1/3 of tooth surface. The highest number of injuries had a maxillary expansion in 1/3 - 38.2%, and at mandibular lesions less than 1/3 - 7.8% and over 2/3 - 8.8%.
**EDS score**

EDS score is an index of severity that is based on a modified version of the DDE index. After examining each subject, in children with hypoplasia, were given a single score EDS to poor enamel. At the 9 children (2.69%) who were found hypoplasia DDS, EDS score ranged from 0.23 to 13.6 for the age range 6-16 years. Mean scores are quite small as the average and this is due to low prevalence in the pediatric population studied.

EDS scores by gender distribution has a range varying from 0.23 to 13.6. Maximum value presents for girls age 7 and 9 years in boys. Index of severity of DDE is 0 in other cases, ie 98.1% for boys and 97.6% for girls. Since no statistically significant differences can be calculated from the average values of EDS based on fault location.

**SCOTS index**

SCOTS index was created and applied as an index of public health in Scotland at the DDE four upper incisors (teeth index). Diffuse opacities were most commonly observed defect 6.58% of the children.

1. **Type of defect**

8.68% of the children examined (n = 29) were identified with the upper incisors DDS, SCOTS score> 0. The prevalence of opacities was 8.68%, hypoplasia 6.89% and combinations of defects 13.79%; DDS combinations occur in 1.49% of children (tab 3).

2.48% of 62 affected teeth are diffuse opacity, hypoplasia 0.38% and 1.24% DDE combinations. On casuistry this studied score varied in the range 1-6, with an average of 2.93 ± 1.81.

**TABLE 3. DDE case distribution (SCOTS)**

<table>
<thead>
<tr>
<th>DDE</th>
<th>Children (n=29)</th>
<th>Children (n=334)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nr.</td>
<td>%</td>
</tr>
<tr>
<td>Opacity</td>
<td>29</td>
<td>100</td>
</tr>
<tr>
<td>Demarcated</td>
<td>7</td>
<td>24,13</td>
</tr>
<tr>
<td>Diffuse</td>
<td>22</td>
<td>75,86</td>
</tr>
<tr>
<td>Hypoplasia</td>
<td>2</td>
<td>6,89</td>
</tr>
<tr>
<td>Combinations</td>
<td>1</td>
<td>3,44</td>
</tr>
</tbody>
</table>

The epidemiological characteristics, the 29 children who presented DDE on upper incisors were not identified significant differences statistically between sexes, age groups.
DDE distribution by SCOTS index shows a prevalence of 8.68% relatively lower than the real one (12.5%), as the index SCOTS clinical examination limited to the four upper permanent incisors, which makes it suitable for screening sites.

2. Defect extension

It was noted that of all affected teeth (n = 62) 51.6% have a DDE extension of less than one third of the tooth surface, 19.3% between the third and two thirds and a 29.1% affecting more than two thirds of the tooth surface.

The highest number of injuries occurred at the II left office with a higher damage than 1/3 - 22.6%. Most DDE were also recorded in the left upper central incisor regardless of the degree of impairment - 37.1%.

2. Defect symmetry

Of the children affected upper front teeth (n = 29) 41.3% had diffuse opacities asymmetric and asymmetric DDE were represented at 68.96% of the children. There have been several types of symmetrical lesions on teeth index. Maxillary teeth were affected by DDE 9.1%, 2.08% and the mandibular.

**Group "Placement"**

The highest percentage of children in the study group is found in 18 (14.02%). Depending on the presence of DDS group was divided into two subgroups, to carry out the terms of a comparison: Group with DDE - 57 children (8.48%), group without DDe - 615 children (91.52%).

**DDE index**

1. Types of defects

The results of this study show that DDE were identified in 57 children (8.48% of cases), 6 of them (1.04%) showing the teeth both opacity and hypoplasia or dyschromia.

Opacities were classified according to appearance cream-white or yellow-brown: white-cream opacities were recorded in 48 children - 7.14%, pits hypoplasia is the most common (1.04%). Reported in number of teeth corresponding to the 57 cases (n = 1288) opacities were recorded in 168 teeth (13.04%), hypoplasia 73 teeth (5.66%), dyschromia 25 teeth (1.94%) (tab. 4).
TABLE 4. DDE case distribution

<table>
<thead>
<tr>
<th>DDE</th>
<th>copii</th>
<th></th>
<th>Nr.</th>
<th></th>
<th></th>
<th>%</th>
<th>Nr.</th>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opacity</td>
<td>49</td>
<td>7,29</td>
<td>168</td>
<td></td>
<td></td>
<td>13,04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White-cream</td>
<td>48</td>
<td>7,14</td>
<td>166</td>
<td></td>
<td></td>
<td>12,88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow-brown</td>
<td>2</td>
<td>0,29</td>
<td>2</td>
<td></td>
<td></td>
<td>0,15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypoplasia</td>
<td>11</td>
<td>1,63</td>
<td>73</td>
<td></td>
<td></td>
<td>5,66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pits</td>
<td>7</td>
<td>1,04</td>
<td>31</td>
<td></td>
<td></td>
<td>2,4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizontal grooves</td>
<td>4</td>
<td>0,59</td>
<td>40</td>
<td></td>
<td></td>
<td>3,1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical grooves</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Absent enamel</td>
<td>1</td>
<td>0,14</td>
<td>2</td>
<td></td>
<td></td>
<td>0,15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyschromia</td>
<td>5</td>
<td>0,74</td>
<td>25</td>
<td></td>
<td></td>
<td>1,94</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On the maxillary - the central incisors have the greatest degree of damage 5.04%, followed by molars 2.17% and mandibular molars were at the greatest degree of damage 2.01% (fig. 4). DDE were more prevalent on the buccal surfaces of teeth.

Fig. 4. Distribution of teeth with DDE depending on the type and location

Cream-white opacity affect most commonly the maxillary central incisors 3.95% and from 8.15% of maxillary anterior teeth (n = 105) affected by DDE, opacities represent 5.27%. Distribution of PT with severe hypoplasia, depending on the type of defect shows differences statistically insignificant. Associations between different types of DDE did not show significant differences.

2. Number and demarcarion of defects

Of 206 teeth with lesions, single maxillary lesions appear to right central incisor and left 4.36%, multiple injuries – right central incisor as 2.42%. Diffuse linear lesions – right central incisor as 2.42%, diffuse-patchy lesions – right lateral incisor as 8.25% (fig. 5). Mandibular level distributed: single lesions - right and left central incisor 4.36%, multiple lesions - right and left M1P 1.45%, diffuse linear lesions - right and left
central incisor 1.45%, diffuse-patchy - right and left lateral incisor 1.45% (fig. 6).

Maxillary diffuse-patchy lesions distribution are prevalent, followed by diffuse maxillary and single mandibular lesions.

![Fig. 5. Number and demarcation of the maxillary DDE](image)

**Fig. 5. Number and demarcation of the maxillary DDE**

**Fig. 6. Number and demarcation of the mandibule DDE**

3. Defect location
Most defects have been an extension on the middle incision involved in the jaw area and was involved at mandibular gingival half.

Modified DDE index

1. Type of defect
DDE resulting prevalence was: 7.29% opacities, hypoplasia 1.63% and dyschromia 0.74%. Opacities were classified as diffuse or demarcated appearance according to appearance in the 57 affected children (tab.5) Of 57 children with DDE 26 have presented only diffuse opacity and 10 (17.54%) had both teeth opacity and hypoplasia or dyschromia. Of the 1288 teeth - 266 teeth affected - corresponding to the 57 cases were registered: opacities - 168 teeth, 13.04%, hypoplasia - 73 teeth, 5.66%, diffuse opacities were recorded on 137 teeth (10, 63%), hypoplasia is found in 73 teeth (5.66%).
### TABLE 5. DDE case distribution

<table>
<thead>
<tr>
<th>DDE</th>
<th>children</th>
<th>teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nr.</td>
<td>%</td>
</tr>
<tr>
<td>Opacity</td>
<td>49</td>
<td>7.29</td>
</tr>
<tr>
<td>Demarcated</td>
<td>19</td>
<td>2.82</td>
</tr>
<tr>
<td>Diffuse</td>
<td>33</td>
<td>4.91</td>
</tr>
<tr>
<td>Hypoplasia</td>
<td>11</td>
<td>1.63</td>
</tr>
<tr>
<td>Dyschromia</td>
<td>5</td>
<td>0.74</td>
</tr>
</tbody>
</table>

Statistically, there is no difference between the distribution of the maxilla and mandible opacity ($\chi^2 = 0.01$, GL = 1, p = 0.938). Diffuse opacity affecting the maxillary central incisors most commonly 3.02% and from 6.9% of maxillary incisors affected by DDE, opacities is 5.27%. Hypoplasia prevalence throughout the studied group was 1.63%. The casuistry studied associations between different types of enamel defects only showed significant differences compared to the opacity of diffuse hypoplasia.

**2. Defect extension**

It was noted that of all affected teeth (n = 254) 43.3% have a DDE extension of less than 1/3 of tooth surface. The highest number of lesions had a maxillary expansion over 1/3 - 24.4%, and at mandibular lesions less than 1/3 to 20.86%.

**EDS score**

In the 11 children (1.6%) who were found DDE hypoplasia, EDS score ranged from 0.23 to 5.75 for the age range 8-18 years. Mean scores are quite small as the average and this is due to low prevalence in the pediatric population studied. EDS scores by gender distribution has a range varying from 0.23 to 5.75. Maximum value presents to boys and girls aged 18 years. Index of severity of DDE is 0 in other cases ie 97.87% 98.98% for boys and girls.

**SCOTS index**

Diffuse opacities were the most common defect observed in 4.01% of the children.

**1. Type of defect**

6.84% of the children examined (n = 46) were identified with PT-DDE of upper incisors, SCOTS score > 0.
The prevalence of opacities was 5.95%, hypoplasia 0.59% and dyschromia 0.29%, opacity have been demarcated to 1.93% of the children, diffuse opacities were seen at 4.01% children (tab. 6).

<table>
<thead>
<tr>
<th>DDE</th>
<th>children (n=46)</th>
<th>children (n=672)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nr.</td>
<td>%</td>
</tr>
<tr>
<td>Opacity</td>
<td>40</td>
<td>86.95</td>
</tr>
<tr>
<td>Demarcated</td>
<td>13</td>
<td>28.26</td>
</tr>
<tr>
<td>Diffuse</td>
<td>27</td>
<td>58.69</td>
</tr>
<tr>
<td>Hypoplasia</td>
<td>4</td>
<td>8.69</td>
</tr>
<tr>
<td>Dyschromia</td>
<td>2</td>
<td>4.34</td>
</tr>
</tbody>
</table>

The epidemiological characteristics in the 46 children who had upper incisors defects were not identified significant differences statistically between sexes, age groups.

DDE distribution by SCOTS index shows a prevalence of 6.84% relatively lower than the real one (8.48%), as the index SCOTS clinical examination limited to the four upper permanent incisors, which it is suitable for screening sites.

2. Defect extension
   It was noted that of all affected teeth (n = 89) 47.2% have a defect extension less than 1/3 of tooth surface. The highest number of lesions occurred at the right upper central incisor less than 1/3 - 19.1%. Most DDE were also recorded in the left upper central incisor regardless of the degree of impairment - 40.4%.

3. Defect symmetry
   It was observed that out of the upper front teeth affected children (n = 46) 32.6% had diffuse opacities symmetric and asymmetric DDS were represented at 56.52% of the children. There have been several types of symmetrical lesions on teeth index.

II.4. DISCUSSION

Group "Ion Ghica"

The prevalence was 12.57% DDS - 11.97% opacities, hypoplasia 2.69% and dyschromia 0.89%. Cream- white opacities were recorded in 11.9% of the children, cavitary hypoplasia 1.49% (DDE) and 9.88% diffuse opacities (modified DDE), somewhat lower values for opacities 8.68% of 6.58% which diffuse opacities (SCOTS) (tab. 7).
TABLE 7. DDE children distribution

<table>
<thead>
<tr>
<th>DDE</th>
<th>DDE</th>
<th>DDEm</th>
<th>SCOTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opacity</td>
<td>%</td>
<td>Opacity</td>
<td>%</td>
</tr>
<tr>
<td>Opacity</td>
<td>11,97</td>
<td>Opacity</td>
<td>11,97</td>
</tr>
<tr>
<td>White-cream</td>
<td>11,9</td>
<td>Demarcated</td>
<td>3,59</td>
</tr>
<tr>
<td>Yellow-brown</td>
<td>0,89</td>
<td>Diffuse</td>
<td>9,88</td>
</tr>
<tr>
<td>Hypoplasia</td>
<td>2,69</td>
<td>Hypoplasia</td>
<td>2,69</td>
</tr>
<tr>
<td>Pits</td>
<td>1,49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizontal grooves</td>
<td>0,89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical grooves</td>
<td>0,89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent enamel</td>
<td>0,29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyschromia</td>
<td>0,59</td>
<td>Dyschromia</td>
<td>0,59</td>
</tr>
</tbody>
</table>

Reported in number of teeth, often presented the following distribution: 8.99% opacities, hypoplasia 1.86%, 0.32% dyschromia (tab. 8) show that SCOTS index diffuse opacities were most commonly observed defect, but half values than those obtained by other indicators calculated solely because the maxillary incisors - 3.18%.

Incisors presented the highest degree of damage followed by premolars, canines and molars. DDE were more prevalent on the buccal surfaces of teeth.

Modified DDE index considered most important aspect demarcated / diffuse opacities in the differentiation of color given to the dental surface defect. The index is used frequently for the purpose of screening studies and as such details hypoplasia. The results obtained from studies with modified DDE index confirmed the ease of use and collection, analysis and interpretation of data easier to understand (13,8,14,15).

Distribution of single lesions are prevalent maxillary teeth, followed by diffuse-patchy, and the lower jaw were linear diffuse lesions. Most defects have been a location for the entire tooth surface and half surface incision involved. Were not affected in any tooth enamel and not all were recorded injuries on the lower central incisors of the gingival half left (DDE). 46.1% have a defect extension less than 1/3 of tooth surface (modified DDE).

The extension of a lesion was more clearly defined in the DDE index and modified DDE index for grading and SCOTS was specific screening studies (16).

EDS score ranged from 0.23 to 13.6 for the age range 6-16 years. Mean scores are quite small as the average and this is due to low
prevalence in the pediatric population studied. Maximum value presents for girls age 7 and 9 years in boys. Index of severity of DDS is 0 in other cases, ie 98.1% for boys and 97.6% for girls.

### TABLE 8. DDE teeth distribution

<table>
<thead>
<tr>
<th></th>
<th>DDE</th>
<th>DDEm</th>
<th>SCOTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opacity</strong></td>
<td>Opacity</td>
<td>Opacity</td>
<td>Opacity</td>
</tr>
<tr>
<td><strong>White-cream</strong></td>
<td>8.99</td>
<td>8.99</td>
<td>8.99</td>
</tr>
<tr>
<td><strong>Yellow-brown</strong></td>
<td>0.21</td>
<td>Diffuse</td>
<td>2.48</td>
</tr>
<tr>
<td><strong>Hypoplasia</strong></td>
<td>1.86</td>
<td>1.86</td>
<td>0.38</td>
</tr>
<tr>
<td><strong>Pits</strong></td>
<td>0.87</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Horizontal grooves</strong></td>
<td>0.87</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Vertical grooves</strong></td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Absent enamel</strong></td>
<td>0.11</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Dyschromia</strong></td>
<td>0.32</td>
<td>0.32</td>
<td>1.24</td>
</tr>
</tbody>
</table>

SCOTS index notes that diffuse opacities were most commonly observed defect, 6.58% of children were affected by diffuse opacities. 51.6% have a defect extension less than 1/3 of tooth surface. The highest number of lesions occurred at the left upper central incisor, involvement smaller then 1/3. Asymmetric DDE were represented at 68.96% of the children. Maxillary teeth were affected by DDS 9.1%, 2.08% and the mandible.

**Group "Placement"**

The prevalence was 8.48% DDS - 7.29% opacities, hypoplasia 1.63% and dyschromia 0.74%, 7.14% white-cream opacities, hypoplasia pits 1.04% (DDE) and diffuse opacities 4.91%, hypoplasia 1.63% (modified DDE) and lower values for opacities 5.95%, 4.01% of the diffuse opacities (SCOTS) (Table 9).

Reported in number of teeth showed the following distribution frequency - 13.04% opacities, hypoplasia 5.66%, dyschromia 1.94%, SCOTS index shows that diffuse or demarcated opacities were observed defects approximately equal, but only half the values those obtained by other indices due to maxillary incisors calculated solely on - 5.59% (tab. 10).
Incisors presented the highest degree of damage, followed by the molars, premolars and canines.

DDE were more prevalent on the buccal surfaces of teeth. Diffuse lesions stained with maxillary teeth distribution are prevalent, followed by diffuse maxillary and mandibular lesions at unique. Most defects have been a half incision location on the surface involved in the jaw and the jaw has been involved at mid-gingival (DDE). It was observed that out of 43.3% affected teeth has a DDS extension less than 1/3 of tooth surface (modified DDE).

EDS score ranged from 0.23 to 5.75 for the age range 8-18 years. Mean scores are quite small as the average and this is due to low
prevalence in the pediatric population studied. Maximum value presents to boys and girls aged 18 years. Index of severity of DDS is 0 in other cases ie 97.87% 98.98% for boys and girls.

SCOTS index notes that diffuse opacities were the most common defect observed in 4.01% of the children. 47.2% have a defect extension less than 1/ of tooth surface. The highest number of injuries occurred at the II with a right upper central involvement in third. Asymmetric DDS were represented at 56.52% of the children.

The large number of children affected in various degrees of DDS is observed in 62.6% of New Zealand -51.6% (17-21), United Kingdom 68% to 44% (22-27), Ireland 63% -53 % (from 8.28 to 30), United States 49% (31) compared with 37% Chile (32), Sri Lanka 29% (33), Tonga 17% (34), Italy 9.8% (35). The prevalence of 12.57% obtained by us in the group of socio-economic status and average 8.48% in the group with low socioeconomic status is closest to the amount described by Ernest (2000) Seycheles 7.4% (36 ), Angelillo et al., (1990) in Italy - 9.8% (35), Hoffman et al., (1988) in Tonga - 17% (34). Multitude of etiologic factors and types of pediatric populations, and variable concentrations of fluoride in the water are responsible for this wide range of values. Comparisons of our study were made with studies asemănătoare concentrations of fluoride in water - Iasi 0.14 to 0.95 mg / l.

The prevalence of diffuse opacities - 9.88% / 4.91% observed in our plots was similar to that obtained in the UK from 9.9 to 10% (22.24) and India 14% (37), the prevalence of demarcated opacities - 3.59% / 2.82% was low compared with the lowest values reported by Almeida et al., 2003 in Portugal from 7.1 to 7.3% (38), hypoplasia showed low 2.69%, higher than those reported by Almeida et al., 2003 in Portugal from 0.3 to 0.9% (38) and lower than Mackay and Thompson (2005) in New Zealand (21).

Maxillary central incisors damage is frequently mentioned in the literature (17.35). In our study, canines and premolars are affected next, while other studies indicate patterns-like premolars mates and receive permanent premolars (35).

Literature data on the prevalence of DDS dental types vary according to geographical area: the New Zealand M1P - 71% (39), Slovenia - 20% (40), Finland - 19.3% (41) and Finland - 100% ( 42), we found the value of 0.5% - 2.01% is due to an increased rate of breakdown by the M1P decay / fillings / root debris / extractions that may mask a much higher frequency of DDS and selected from the lot a population with socio-economic status and low average. Wong reported a prevalence of 35.2% of
permanent incisors DDS at (43), and looks like Mackay and Thomson that diffuse opacities are most commonly seen in maxillary central incisors 32.4% (21), and after Montero and Douglass opacities affect the teeth prior to jaw 50% (31). Lower values a statistical report made in the UK in 1993 and 2003 1-2% (44). The prevalence of hypoplasia on intrgul lot studied was 2% values consistent with those reported in 2003 in the UK, of which 0.69% is represented by hypoplasia of the maxillary central incisors cut on edge (45).

Results from the literature (21) shows that the majority of diffuse opacities affects more than one third of the facial surface of teeth, maxillary central and the II was the most affected tooth. Maxillary teeth were affected by DDS 9.18% / 11.62%, and the mandibular 1.94% / 8.44%. Data obtained by us are slightly higher than those obtained in other studies: 7.6% and 4.3% (22).

Most defects affecting the equal right - left maxillary lateral incisor and the canine exception, which has more defects on the right and mandibular M1P which has several defects on the left side (22). Dummer associated with a slight tendency of boys to have several defects due to slight delays in the development of girls and so damage for longer periods of tooth mineralization (22).

Fyffe study by using the same index shows a much higher prevalence about 50% of that obtained by us - 8.68% / 6.84%, due to the excessive use of fluoride in the countries of northern Europe and so diffuse and symmetrical lesions (46).

The comparisons we made in our study can not be taken as absolute value although they fail to give an insight into the specificity DDS in different populations. The limits and possibilities of these comparisons have convinced us of the need for several classification indices for populations as large DDS.

The prevalence of DDS in the group studied using modified DDE index (n = 1006) indicated that 9.8% of children experienced at least one tooth affected, of which 90 children (90.9%) had at least one previously affected tooth. Highest frequency obtained was for opacities (69.7%). Within these were 49.5% and 20.2% diffuse opacities demarcated opacities.

### II.5. CONCLUSIONS

1. Estimated prevalence of DDS in our study is 12.57% in the group average socioeconomic status and 8.48% in the group with low socioeconomic status index using DDE / DDE 8.68% respectively as - 6.84% index by SCOTS. 9.8% of children experienced at least one tooth
affected, of which 90 children (90.9%) had at least one previously affected tooth.

2. In the index we use the DDE index used as a tool that is best suited to the classification criterion based on a DDS descriptive and has a recording system suitable for opacities that are most represented in the studied group of new and modified DDE index is useful in screening tests.

3. SCOTS index limited clinical examination only four incisors makes it superior to what's suitable for screening, but provides a lower value than the actual defects that require examination of all teeth in the arch.

4. Highest frequency was recorded for opacities (69.7%), followed by hypoplasia 8.1% and 21.2% combinations of defects. 49.5% in the opacities and diffuse opacities were 20.2% demarcated opacities.
Developing tooth is sensitive to the negative influences of genetic and environmental factors. Many growth and development disorders may improve over time, but since dental hard tissues are not renewed, these defects will persist.

III.1. STUDY PURPOSE

The purpose of the prospective study was to monitor and evaluate the PT- DDE in a pediatric population in an area with low socio-economic status, environment and determine the correlation with possible etiologic factors determinants.

III.2. MATERIAL AND METHODS

III.2.1. Etiological particularities study of permanent teeth enamel developmental defects

The study group comprised 1006 children aged 5-18 years, 541 boys (53.8%) and 465 girls (46.2%) from Iași and Târgu Frumos with a mean age 12.88 ± 3.59 years and 66.8% low socio-economic status.

334 children were from urban areas with average socio-economic status - school "Ion Ghica" in Iași and 672 children in urban areas with low socio-economic status (institutionalized) in Placement centers in Iași and Târgu Frumos.

Depending on the presence of DDE children were divided into two groups: Group with DDE - 99 children (9.8%), Group without DDE - 907 children (90.2%).

III.2.2. Clinical variability characteristics study of permanent teeth enamel developmental defects

The study group comprised 1006 children from urban areas - Iași and Târgu Frumos, of which 334 children were from urban areas with average socio-economic status - school "Ion Ghica" in Iași and 672 children with low socioeconomic status - Placement centers in Iași and Târgu Frumos.

III.2.3. Clinical examination

Before beginning this study of children's parents and teachers were informed of its purpose and were obtained informed consent and knowingly
authorized, written and signed. It was necessary to obtain consent to conduct research education institutions and teacher support for this study. Not included in the study were children who did not receive consent from parents / guardian and have not signed the consent form knowingly informed and empowered, written and signed.

Parents filled out a questionnaire with three sections: sociodemographic 1.Date maternal age, education, socioeconomic status, maternal medical 2.antecedente: number of pregnancies, treatment with antibiotics during pregnancy, hypertension, urinary infections, bleeding antepartum, smoking 3.antecedente child's health: a newborn: sex, gestational age (preterm / term), type of birth, birth weight <2500g - low birth weight), oxygen administration more than 15 days, the score APGAR, parenteral nutrition, neonatal infections, b.tipul alimenatiei up to 6 months; c.bolile childhood: measles, mumps, whooping cough, persistent viral infections that occur in acute upper respiratory tract treated with antibiotics, d. general conditions: neurological disorders, allergies, skin problems, surgery - planned admissions, acute illness, chronic illness acquired otitis media, asthma, infections, e.traumatisme temporary teeth; f.expunerea to sodium fluoride in drinking water, g. antibiotics in the first four years of life (amoxicillin, penicillin, cephalosporins, macrolides). Were completed Pediatric clinical observation sheets (sheets WHO) in school year 2007-2010.

The children were evaluated in natural light without drying or washing prior to teeth. Ideally, teeth should be dry at the time of examination, cleaning deposits pigment and soft as the real surface of the tooth exposed so you can see hidden defects that can escape from a routine clinical examination. Clinical examination was performed by a single examiner (MRM), with detailed examination of the affected areas of natural light, the additional suspects were explored dental probe to determine the contours and surface defects.

Diagnosis was made by comparison with standard images after the examiner was familiar with such defects as defined by defining modified DDE index. The diagnosis was made easier when the defect is obvious, and when in doubt, the tooth surface was rated as normal.

Complementary explorations clinical examination consisted of photographic examination (camera Canon G9). Data were reviewed together with a specialist and was made a presumptive diagnosis. Children with DDE were called to review after they have been given oral hygiene and information on the specific condition.
For classification data were used for screening tests modified DDE index. Data were processed using statistical functions of EpiInfo, Excel (Microsoft Office) and SPSS 16 Statistics 8 using non-parametric test of materiality $\chi^2$ with generally accepted 95%, $p < 0.05$.

III.3. RESULTS

III.3.1. Etiological particularities study of permanent teeth enamel developmental defects

Average age of mother at birth was 21 years in the sample studied, of which there were no significant differences between maternal age at birth compared to the types of DDS ($t = 1.09$, GL = 112, $p > 0.05$).

Depending on the mother's education is observed a significantly lower frequency of mothers with higher education who have children with DDS: 19.2% of mothers with higher education had children with DDE, while children without mothers with higher education DDS resulted in approximately 50% ($\chi^2 = 31.98$, GL = 1, $p < 0.001$).

The mothers whose children have experienced DDS in the number of pregnancies did not reveal statistically significant differences ($p = 0.325$), highest frequency occurred in the number of pregnancies in mothers with two tasks (4.2 %) and also noted a rate of 1.8% of mothers who had more than 4 tasks.

The studied case law is observed that maternal history has altered the distribution of strong differences statistically in developing PT: antibiotics administered prenatal and antepartum haemorrhage were characteristic only for mothers who developed DDS, significant frequency differences between the two groups of study occurred in children whose mothers had hypertension ($p < 0.001$) with a relative risk of over 47 times higher and urinary infections before birth ($p = 0.003$) with a relative risk of more than 20 times higher.

Mothers smoking during pregnancy were significantly more in children who developed DDE group ($p = 0.042$). 10% of the cases mentioned in the questionnaire were premature. 89.9% of children born prematurely have developed DDE ($p < 0.001$).

The casuistry studied (n = 1006) type of normal birth prevailed (67%) and, notably, a rate of about 10% of the cases mentioned in the questionnaire were premature.

The share of female cases of premature birth or normal was slightly more common than male cases, while a slightly higher dystocic birth occurred in boys. Percentage differences were not statistically significant ($p$
Premature babies have a gestational age below 37 weeks (less than 259 days) and birth weight <2500 g term newborn has an age of 37-42 weeks (259-293 days) (47). 89.9% of children born prematurely have developed DDE (p <0.001).

Oxygenation of the newborn premature babies over 15 days was performed in 15% of children who developed DDE (p <0.001), this does represent a relative risk 10 times higher for a child to develop a dental injury (RR = 10.39, CI95: 7.94 ÷ 13.59).

Apgar score was slightly lower in children with DDE (8.9 ± 2.8) than those without DDE (8.9 ± 3), but the difference was not statistically significant (p> 0.05 ). 9.9% of children had a birth weight under 2500 g, and the group of children with DDE, the average age was significantly lower gestational (36.7 ± 2.7) compared with patients without DDE group (39.4 ± 1.2) (p <0.001). Average weight at birth was 3250 ± 414 g in the entire group studied.

In children who developed DDE average weight at birth was significantly lower than that of children without DDE (p <0.001). In the group of children with DDE, the average age was significantly lower gestational (36.7 ± 2.7) compared with patients without DDE group (39.4 ± 1.2) (p <0.001). 19.7% of artificially fed children in the first 6 months of life developed DDE, significant difference compared with those who were fed the first 6 months (7%) (p <0.001).

Personal history of diseases identified in children with DDE were different (tab. 11).

Note that persistent acute viral infections, upper respiratory tract were significantly more common in children in group "Ion Ghica" with DDE compared with those without (p = 0.000003). In the group "Placement" significant reports met for more diseases: mumps (p = 0.0002), persistent acute viral infections of upper respiratory tract (p = 0.003), chronic illness (p = 0.005), otitis (p = 0.0004), asthma (p = 0.021), other infections in the DDE group (p = 0.0007), trauma of temporary teeth (p = 0.000005) (tab. 12).

In terms of disease association of his antecedents and types of lesions observed in the modified DDE index classified both groups, the most common diseases observed relationship compared to those demarcated diffuse opacities, but were not statistically significant differences (χ² = 10.30, GL = 8, p = 0.245 respectively c² = 5.31, GL = 8, p = 0.622).
Regarding the association of history of disease in children with extension DDE distribution is observed more frequently in the third tooth surface compared to other locales, but statistically speaking not confirm this difference. The types of diseases associated with, there has been no statistical significance in the relationship between hypoplasia and diffuse opacities (\( \chi^2 = 2.21, \) GL = 8, \( p = 0.961 \)) or between hypoplasia and discromii (\( \chi^2 = 6.75, \) GL = 8, \( p = 0.455 \)).

Regarding extension of diseases associated DDE based damage is observed more frequently in the third tooth surface damage more extensive than between 1/ to 2/, not statistically significant (\( \chi^2 = 9.26, \) GL = 8; \( p = 0.321 \)).

20.1% of children have not taken any antibiotic, and 68.5% received two or more different antibiotics. Penicillin V and amoxicillin were the most commonly used antibiotics. During the first year of life, 21.6% of children were treated with penicillin or amoxicillin or both. Significant association is done largely with general conditions of his antecedents. The relative risk ranged from 2.14 in combination with asthma antibiotic
administration until 24.98 when combined with a history of neurological disease (tab. 13).

**TABLE 12. Distribution of disease in the groups studied**

<table>
<thead>
<tr>
<th>Boli în antecedente</th>
<th>Lot „Ion Ghica”</th>
<th>Lot „Plasament”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic semnificance</td>
<td>RR (IC95%)</td>
</tr>
<tr>
<td>MS</td>
<td>0,445</td>
<td>-</td>
</tr>
<tr>
<td>M</td>
<td>0,509</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WC</td>
<td>0,591</td>
<td>-</td>
</tr>
<tr>
<td>PVI</td>
<td><strong>0,000003</strong></td>
<td>0,30</td>
</tr>
<tr>
<td></td>
<td>(0,30-0,60)</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td>0,180</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>0,322</td>
<td>0,39</td>
</tr>
<tr>
<td></td>
<td>(0,05-2,82)</td>
<td></td>
</tr>
<tr>
<td>DD</td>
<td>0,179</td>
<td>0,29</td>
</tr>
<tr>
<td></td>
<td>(0,04-2,09)</td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>0,416</td>
<td>0,63</td>
</tr>
<tr>
<td></td>
<td>(0,20-1,97)</td>
<td></td>
</tr>
<tr>
<td>AD</td>
<td>0,771</td>
<td>1,08</td>
</tr>
<tr>
<td></td>
<td>(0,66-1,75)</td>
<td></td>
</tr>
<tr>
<td>CD</td>
<td>0,307</td>
<td>1,90</td>
</tr>
<tr>
<td></td>
<td>(0,55-6,52)</td>
<td></td>
</tr>
<tr>
<td>OM</td>
<td>0,214</td>
<td>0,43</td>
</tr>
<tr>
<td></td>
<td>(0,11-1,75)</td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td>0,276</td>
<td>3,48</td>
</tr>
<tr>
<td></td>
<td>(0,32-37,51)</td>
<td></td>
</tr>
<tr>
<td>OI</td>
<td>0,609</td>
<td>0,74</td>
</tr>
<tr>
<td></td>
<td>(0,24-2,34)</td>
<td></td>
</tr>
<tr>
<td>TTT</td>
<td>0,125</td>
<td>1,54</td>
</tr>
<tr>
<td></td>
<td>(0,90-2,64)</td>
<td></td>
</tr>
</tbody>
</table>

**III.3.2. Clinical variability characteristics study of permanent teeth enamel developmental defects**

Of the children examined, we present below a number of cases for variation forms conclusive clinical and etiological factors that illustrate the types of injuries frequently with lower gravity and lower incidence cases, but greater severity of the study population.
### ABLE 13. DDE risk due to consumption of antibiotics in relation to the illnesses associated

<table>
<thead>
<tr>
<th>Associated diseases</th>
<th>Antibiotic consumption</th>
<th>RR</th>
<th>IC95%</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>children with DDS n %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>0 0</td>
<td>14</td>
<td>1,4</td>
<td>-</td>
</tr>
<tr>
<td>M</td>
<td>3 0,3</td>
<td>6</td>
<td>0,6</td>
<td>2,41</td>
</tr>
<tr>
<td>WC</td>
<td>0 0</td>
<td>3</td>
<td>0,3</td>
<td>-</td>
</tr>
<tr>
<td>PVI</td>
<td>28 2,8</td>
<td>202</td>
<td>20,1</td>
<td>8,21</td>
</tr>
<tr>
<td>ND</td>
<td>2 0,2</td>
<td>57</td>
<td>5,7</td>
<td>24,98</td>
</tr>
<tr>
<td>A</td>
<td>3 0,3</td>
<td>53</td>
<td>5,3</td>
<td>15,74</td>
</tr>
<tr>
<td>DD</td>
<td>5 0,5</td>
<td>67</td>
<td>6,7</td>
<td>12,32</td>
</tr>
<tr>
<td>PA</td>
<td>11 1,1</td>
<td>89</td>
<td>8,8</td>
<td>7,96</td>
</tr>
<tr>
<td>AD</td>
<td>21 2,1</td>
<td>173</td>
<td>17,2</td>
<td>8,91</td>
</tr>
<tr>
<td>CD</td>
<td>11 1,1</td>
<td>45</td>
<td>4,5</td>
<td>4,25</td>
</tr>
<tr>
<td>OM</td>
<td>10 1,0</td>
<td>55</td>
<td>5,5</td>
<td>5,48</td>
</tr>
<tr>
<td>AB</td>
<td>3 0,3</td>
<td>5</td>
<td>0,5</td>
<td>2,14</td>
</tr>
<tr>
<td>OF</td>
<td>21 2,1</td>
<td>117</td>
<td>11,6</td>
<td>5,93</td>
</tr>
<tr>
<td>TTT</td>
<td>32 3,2</td>
<td>132</td>
<td>13,1</td>
<td>4,70</td>
</tr>
</tbody>
</table>

**Clinic case I** – M.N., male, 15 years-old, Iași.

**AHC** – insignificant;

**AP** – insignificant;

**APS** – complicated septic pulp necrosis of maxillary temporary central incisors, recurrent infections secondary to periapical fistula secondary to early childhood caries (ECC) observed at very early age, untreated, followed by premature loss of TT (4 years-OLD);

**Facial examination** – normal.

**Endooral examination** – teeth are present on both arches, E looks normal - normal color and transparency. Central incisors present unique creamy-white lesions on the buccal areas in third incisal part with irregular contour smooth, diffuse, without clearly defined edges of E adjacent to normal. E thickness of the lesion is not affected. Vitality tests are positive.

**Fig. 7. a. M.N. (15 years-old).** Diffuse opacities – Maxillary central incisors; **b. U.A. (8 years-old).** Demarcated opacities - Maxillary central incisors.
Following clinical examination and photography I was diagnosed with *diffuse opacity* (Fig. 7.a).

**Clinic case II** – U.A., male, 8 years-old, Iași.
- AHC – insignificant;
- AP – insignificant;
- APS – trauma of deciduous teeth from falls and partial crown fracture of maxillary central incisors of at the age of 1 year-old, followed by untreated pulp necrosis;
- **Facial examination** – normal;
- **Endooral examination** – teeth are present on both arches, E looks normal - normal color and transparency. Central incisors present unique creamy-white lesions on the buccal areas in third incisal part with irregular smooth contour, well separated from adjacent normal E. E thickness of the lesion is normal. Vitality tests are positive.

Following clinical examination and photography I was diagnosed with *demarcated opacity* (fig. 7.b).

**Clinic case III** – A.N., male, 8 years-old, Iași;
- AHC – insignificant;
- AP – hipocalcemia until 1 years-old;
- APS – complicated septic pulp necrosis of temporary lower central incisors, deep carious lesions on temporary molars, untreated;
- **Facial examination** – normal.
- **Endooral examination** – mixed dentition in both arches, maxillary and mandibular. Temporary teeth have extensive coronary destructions by decay. Mandibular M1P present cavitary defects in the vestibular cusps, in the absence of E is seen the underlying dentin. Upper permanent central incisors present buccal E surface of apparently normal thickness, diffuse white opacities on incisal half, and the lower right permanent central incisor presents vestibular surface with the half-creamy white unique lesion with well-differentiated appearance, E adjacent normal, smooth and thick. Vitality tests are positive, registering an increased sensitivity to thermal and chemical stimuli on mandibular M1P.
Fig. 8. A.N. (8 years-old). a. White diffuse opacity – maxillary central incisors, Demarcated opacity on right lower central incisor; b. Detail - cuspidian hypomineralization of left mandibular M1P.

Following clinical examination and photography I was diagnosed with *sdr. MIH* (fig. 8).

**Clinical case IV** – C.A., male, 18 years-old, Iaşi.

**AHC** – insignificant;

**AP** – chicken pox at 2.5 years-old;

**APS** – deep cavity on the left maxillary M2P treated and bimaxillary M1P untreated, extensive root destructions on mandibular M2P, untreated;

**Examen facial** – normal.

**Endooral examination** - in both arches, S looks slightly yellow opaque, smooth, creamy-white spots in the third gingival part on emphasized on the lower incisors. Maxillary premolars and maxillary and mandibular M2P present horizontal linear depressions in the vestibular and cuspidian area. Mandibular M2P has extensive crown destruction and left maxillary M2P is restored by composite fillings. The left gingival maxillary areas present a number of *E* fractures occur in thinned *E* of lateral incisor-canine level. Vitality tests of M2P are negative.

Following clinical examination and photography have been diagnosed *chronological hypoplasia* (fig. 9-10).

Fig. 9. C.A. (18 years-old). a. Cuspidian hypoplasia - second premolar and bilateral maxillary M2P; b. Cuspidian hypoplasia - second bilateral premolar.
Fig. 10. C.A. (18 years-old). a. Detail hypoplasia second left maxillary premolar – oclusal view; b. Detail hypoplasia second left maxillary premolar – vestibular view; c, d. Detail hypoplasia right maxillary M2P–occlusal view; e. Detail hypoplasia hypoplasia second right maxillary premolar - oclusal-buccal view; f. Detail hypoplasia second left mandibular premolar - oclusal-buccal view.

Clinical case V – A.C., female, 12 years-old, Iași.  
AHC – insignificant;  
AP – dyspepsia and deficiency diet during the 1-2 years age;  
APS – extinse cavities on TT, M1P with corono-root destruction were extracted at the age of 10 years;  
Facial examination – normal.  
Examination endooral – in both arches, maxillary and mandibular, E has incisivo-canine horizontal linear grooves. Yellow-brown bands situated at half part buccal face of the central upper and lower incisors and lower third of buccal area of upper lateral incisors and canines, wider on the central maxillary incisors. Thickness of affected E is reduced and is more pronounced on the upper lateral incisors and maxillary and mandibular canines and less on the lower incisors; E hardness is normal. Lower M1P are absent. Crown shape is not affected. Vitality tests are positive.
Following clinical examination and photographic smoothly I was diagnosed with *chronological hypoplasia* (fig. 11).

**Clinical case VI** – M.S., male, 18 years-old, Iaşi.

**AHC** – insignificant;

**AP** – deficiency rickets associated with diet from birth to 2 years;

**APS** – periapical infection common in M1P crown-root fracture followed and their extraction by the age of 16;

**Facial examination** – normal.

**Endooral examination** – incisiv-canine group presents more marked hypoplasia appearance on the upper and lower central incisors half-cuspidian-incisal area with horizontal linear depressions, multiple linear depressions in the central and lateral incisors superiors. In the upper central incisor fracture is observed on the right angle and maxillary and mandibular central incisors incision edge, mandibular incisors present abrasion gr.I. E has s normal color and translucency, but reduced thickness. Interdental contact points at the front are absent, especially visible at the mandible. Premolars and molars show no signs of impaired hypoplastic areas (bimaxilar M1P is absent). Vitality tests are positive.
Fig. 12. M.S. (18 years-old). a. Maxillary incisiv-canin hypoplasia; b. Detail right maxillary incisiv-canin hypoplasia; c. Detail left maxillary lateral incisor-canin hypoplasia; d. Mandibular incisiv-canin hypoplasia.

Following clinical examination and photography have been diagnosed *chronological hypoplasia* (fig. 12).

Caz clinic VII – M.A., male, 18 years-old, Iaşi.
AHC – insignificant;
AP – hypocalcaemia and rickets deficiency associated with diet 6 months to 2.5 years;
APS – cwn-root fracture secondary to abrasion increased M1P, periapical infections secondary to lack of dental treatment and their extraction by the age of 14-16 years-old;
**Facial examination** – normal.
**Endooral examination** - in both arches, maxillary and mandibular, E has linear depressions, at incisiv-canine group and thin E, rough to the M1P.
Cavities varying in size and depth and affects incisal buccal half of maxillary central incisors and very little mandibular incisors, lateral incisors and cuspidian third of bimaxillary canines. Maxillary M1P have dismorfic aspect, thin E, increased abrasion, the mandibular M1P being absent. Premolars and M2P are not affected. Vitality tests are positive.
Fig. 13. M.A. (18 years-old). a. Bimaxillary incisiv-canine pits hypoplasia; b. Detail incisiv-canine right pits hypoplasia with maxillary central incisors superficially affected; c. Detail M1P extended hypoplasia; d. Detail mandibular lateral incisor-canine hypoplasia.

Following clinical examination and photography have been diagnosed *chronological hypoplasia* (fig. 13).

**Caz clinic VIII** – D.A., female, 9 years-old, Iași.
**AHC** – insignificant;
**AP** – sister have the same abnormality, but in a more attenuated;
**APS** – molars and incisors when eruption temporary showed normal appearance, followed by partial or complete separation of $S$ in the near future;
**Examen facial** – normal.

**Endooral examination** – mixed dentition in both arches, maxillary and mandibular. $E$ was separated from TT except the canines and temporarily left maxillary first molar. When PT erupted apparently they look normal, but $E$ was soon emerges from the tooth surface, remaining attached only at the package and a thin upper central incisors on the edge of the incision. M1P are most affected, with increased abrasion and cusps reduced in height. Permanent lower incisors are the least affected. Vitality tests are positive.
a.

b.

c.

Fig. 14. D.A. (9 years-old). a. Hipomineralizare bimaxilară cu S absent pe incisivii centrali maxilari și opacitate difuză pe incisivii mandibulari; b. Hipomineralizare maxilară cu S absent pe molarii temporari și M1P; c. Hipomineralizare mandibulară cu S absent pe molarii temporari și M1P.

Following clinical and photographic examination was diagnosed with *generalized hipomineralised amelogenesis imperfecta form - autosomal dominant* (fig. 14).

**Caz clinic IX** – C.O., female, 14 years-old, Iași.
**AHC** – brothers have similar dental opacities varying degrees;
**AP** – living environment was associated with an alternative supply from underground sources of water until the age of 14;
**APS** – were given fluoride tablets to 12 years-old;
**Facial examination** – normal.
**Endooral examination** – in both arches, maxillary and mandibular, E shows opacities with smooth, creamy-white surface, extended to all dental surfaces, with parallel linear aspect more visible on the gingival half following perikymata.

Following clinical examination and photographic diagnosis of *dental fluorosis* have on average (fig. 15).
Fig. 15. C.O. (14 years-old). a. White opacities covering all over teeth bimaxillary, linear trajectory visible in half gingival; b. Detail linear opacities paths in half gum area.

III.4. DISCUSSIONS

III.4.1. Etiological particularities study of permanent teeth enamel developmental defects

In our study there were significant differences according to mother's education, socioeconomic status or smoking, but there were no significant differences according to maternal age at birth, number of pregnancies, compared to the types of DDE. Mother of diseases considered significant frequency differences between the two study groups occurred in children whose mothers had: hypertension (p <0.001) with a relative risk of over 47 times higher and urinary infections before birth (p = 0.003) with a relative risk of more than 20 times larger, diffuse opacities had a risk 7.5 times higher in children whose mothers have experienced these two diseases before birth. Prenatal and antepartum hemorrhage administered antibiotics were characteristic only for mothers who developed DDE.

Arrow of neonatal infections associated with increased prevalence of demarcated opacities in M1P and prematurity and other general conditions in the same period with the same type of diffuse opacities dental (48).

Maternal factors - maternal age at birth, diseases in the last trimester of pregnancy, smoking, medical care during pregnancy, educational level or economic status were not correlated with DDE, unlike sdr. MIH who presented a risk 3 times higher for maternal diseases during pregnancy and birth complications (49). Low socio-economic status is the main factor in the emergence of risk hypoplasia (50).

However, insufficient fetal development causes a number of chronic diseases, neurodevelopmental disabilities, disability and functional limitations decreased risk is directly proportional to gestational age and low birth weight (51,52).

DDS etiology in children with low birth weight is due to altered calcium homeostasis during the neonatal period as a result of various systemic diseases (53). Ameloblast damage during the secretory phase /
matrix maturation DDE dental appearance just moments indicated by pre / postnatal etiologic factor of the action (54). For incisors and M1P secretory phase begins in utero (55), and maturation phase begins after birth (56).

Mineralization disturbance or trauma produced during this period may result in DDE (57). Clinical studies show an increased prevalence of permanent dentația DDE in premature babies (58,57,53) due to general damage (diseases, disorders or disabilities due to prematurity). These defects may persist for at least the first decade of life (59). Enamel hypoplasia in PT correlates with low birth weight (53,57), but recent studies the results are insignificant (60). Hypoplasia prevalence (19%) is generally lower than the opacity (40%) (60). In the studied group of premature infants with low birth weight, opacity were the majority 83.1% to 16.9% hypoplasia.

In our study 10% of children were born prematurely and 89.9% of children born prematurely have developed DDE. Oxygenation of the newborn premature babies over 15 days was performed in 15% of children who developed DDE (p <0.001), this does represent a relative risk 10 times higher for a child to develop a dental injury.

Children with DDE had an average weight average gestational age at birth and significantly lower than that of children without DDE (p <0.001). Average gestational age was statistically significantly lower in the group with the children without DDE (respectively, p <0.001). van Amerongen and conducted a pilot study Kreulen in the Netherlands suggest that diseases related to the birth (born premature or prolonged labor) causes hypoplasia associated with demarcated opacities in permanent first molar (61).

Pimlott et al. conducted a study of premature babies with low birth weight and found an increased prevalence of maxillary central incisors opacity to 59% and 12% in maxillary lateral incisors due to stress first months after birth, but they could not achieve statistically significant association with weight at birth, gestational age or Apgar score (58). Seow noted that DDE is more common in M1P (21%) and lateral incisors (12%) of children with low birth weight (57).

Aine et al., Obtained a prevalence of DDS to more premature babies compared to babies born at term - 83% and 36% (53).

In our group in premature infants DDE prevalence much higher than term babies - 89.9% and 1.1%. The maxillary central incisors affecting our study was predominantly upper 60% cases, and lower average weight at birth was significantly lower in children with DDE group (1965 ± 391 g)
compared with those who were not identified DDE (3114 ± 332 g) (p <0.001).

Because PT mineralization begin several months after birth prematurely, persistent metabolic disturbances affecting calcium homeostasis mineralization and the first PT. Another study of 100 premature children indicate that DDE occurs in 35% of cases and 51.43% of them had low birth weight (<2500g), compared to 14.29% by weight more than 2500g. There was no correlation with the Apgar score (62). Although differences between the two groups studied were made to the socio-economically most common disease prevalence was similar in the group with DDE - temporary dental trauma 35.08% 28.57% respectively and the group without DDE – infections. Persistent acute viral upper respiratory tract 57.53% and 36.84%. Higher values recorded in the group without DDE for seasonal conditions is due mainly living environment associated with poor health education for families of children at a time in orphanages which predispose to an increased exposure both through increased mobility and spread by contact and diverse population. Temporary tooth trauma in the pediatric population increased frequency, although the consequences for the PT may go unnoticed. Differentiating factor between the groups after acute diseases DDE do for children from different socio-economic environment - 30.95% and acute viral infections, persistent upper respiratory tract - 36.84% for children with socio-economic status reduced. Not surprisingly, each type of environment has a number of factors, higher living standards in association with other risk factors for acute non-seasonal.

Lowest values of the overall disease prevalence were recorded in groups DDE childhood diseases and neurological disorders in addition to and without DDE groups for asthma and whooping cough. Free medical care for children in early years has increased access to immunizations for a specific number of diseases called "childhood" and thus decreased their frequency of overt forms. Asthma has been shown to have reduced values, but children can have a variety of common respiratory diseases or undiagnosed forms of the disease especially in low socioeconomic environments.

The frequency of significant disease in children in group met with average socio-economic status than those without DDE was noted only at the level of persistent viral infections in acute upper respiratory tract (p = 0.000003).

In the group with low socio-economic status reports gathered significant for several diseases in which the strongest were for temporary
dental trauma (p = 0.000005) and the rest with lesser significance - with mumps (p = 0.0002), otitis media (p = 0.0004), other infections (p = 0.0007), acute viral upper respiratory tract persistent (p = 0.003), chronic diseases (p = 0.005), asthma (p = 0.021). Institutionalized children have special needs specific care hospital during their shelters, but some of them return to their families for periods when school is subject to multiple infectious factors and access to treatment is limited or socio-economic conditions or the geographical.

Disease association of his antecedents classified types of DDE modified DDE index in both groups studied, the most frequently observed relationship with diffuse opacities than those demarcated but were not statistically significant differences.

Regarding the association of history of disease in children with extension DDE distribution is observed more frequently in the lower third compared with other locations in batch 'Ion Ghica' or lower third localization compared with 1/3 - 2/3 in the group "Placement" However, the statistically not confirmed this difference (χ² = 11.06, GL = 8, p = 0.198 and χ² = 9.26, respectively; GL = 8, p = 0.321).

Data from studies indicate that DDE had an increased incidence in children with general diseases or trauma history and diffuse opacities were found where high exposure to fluoride. Childhood diseases, sex and living environment have significantly influenced the presence of DDE (17). Lack of association between childhood illnesses, medication given and DDE type was observed by Arrow (48). Suckling et al., Continued study possible correlations and obtain significant results in combination hypoplasia - 15% of New Zealand children with varicella-zoster virus infection before age 3 years and temporary dental trauma (20). Living environment associated with a high concentration of fluoride in water have significantly influenced the results, although the prevalence of diffuse opacities was higher. Significant association between chickenpox and hypoplasia is obtained from a sample of children 9 years in the same area, specifying that although access to specific immunizations by age 2 years was achieved in 90% of children in Dunedin (New Zealand) condition is endemic in this area, and a peak period of infection surprised when people in the group studied was 2-3 years (63). Association chickenpox - sdr.MIH was raised and in other studies (49).

Viral infections were associated with hypoplasia (64) and acute respiratory viral infections with DDE (65), while Suckling and Pearce do not notice an increased prevalence (17). The combination of diffuse
opacities and bronchial asthma was not significant, but indicated an upward trend largely due to their increased frequency or increased susceptibility to acute viral respiratory infections (63).

Association with acute respiratory disease that caused the child's hospitalization was slightly significant. Some authors have observed a positive correlation between respiratory diseases such as asthma and the presence of demarcated opacities to M1P in boys in the first year of life (66), while other authors have suggested that asthma is associated with the development of DDE (61,67), enamel hypoplasia (68). Correlation hypoplasia and a number of respiratory infections, exposure to tobacco smoke, asthma is significant in the study by Ford et al. (50). Ameloblasts are very sensitive to oxygen and it has been hypothesized that asthma in children with DDS is due to previous episodes of hypoxia. These may be related to the disease itself rather than drug treatment (69) or the disease itself could not be separated from the antibiotics administered (66,70).

Tapias et al. associated risk of urinary infections DDE (in the second year of life - 25 times, and in the third year of 7 times) and pneumonia (fourth year of life - 14 times), while the first pediatric care year of life and otitis media, treatment with macrolides, cephalosporins, anticongestionante and bronchodilators in the fifth year of life have a weak correlation with DDE (71). In a further study Tapias-Ledesma et al. found an increased risk of 3.4 to 4.16 times the DDE based M1P pediatric care in the first year of life, urinary tract infections 32 times and 6 times in the second and third year of life, sex Women are also at increased risk in this study (72). Other risk factors mentioned by authors such as gastrointestinal disorders secondary infection such as not taking antibiotics (73,74) in the second year of life, otitis media and varicella in the third year of life, amoxicillin cough medication, respiratory disease upper or lower tract were not significantly associated with DDE. Pneumonia in the fourth year of life is a greater risk factor for boys and girls pediatric nurse. Pneumonia, otitis media and febrile episodes were cited with a high temperature also causes incisor-molar hamomineralizărilor (75). Similar results obtained and Ford et al. hypoplasia in combination with otitis media, urinary tract infections and chicken pox, chicken pox and combinations of urinary tract infections or chickenpox and exposure to tobacco smoke is associated with an increased number of hypoplasia (50).

Exanthematic disease (chickenpox) were cited in the literature etiologic factors (65,76).
Dental development, similar to other organs is vulnerable to severe nutritional deprivation during the critical period of development (77).

Nutrition is important for proper tooth development in the period when teeth are susceptible to various disturbing factors (9). According to some authors, malnutrition and childhood diseases are risk factors for diffuse and demarcated opacities (78,79). Nutritional deficiencies of the earlier phase of mineralization of enamel defects may lead to development of calcium and vitamin deficiency can cause hypoplasia by impaired secretory ameloblastic function.

Risk due to consumption of antibiotics DDE in relation to associated diseases are considered for most diseases. The relative risk ranged from 2.14 in combination with asthma antibiotic administration until 24.98 when combined with a history of neurological disease.

III.4.2. Clinical variability characteristics study of permanent teeth enamel developmental defects

DDE is caused by local factors - a single tooth defects, asymmetric, or general factors (genetic or environmental) that produce so-called chronological defects - defects more teeth by the time its proceedings and the default time dental development.

Local factors most frequently observed in our study were trauma with temporary teeth intrusion causing damage to the E to PT. Also periradiculare chronic infection, unexpected treatment or extraction tools are inadequate to TT a number of factors that cause the PT- DDE (1). General factors acting prenatally, perinatally or postnatally. Neonatal line is observed as a result of the stress produced by birth on dental development, but any factor determines a structural defect superadd visible. The known data on a number of chemicals - fluoride, prematurity or low birth weight, vitamin D deficiency, hypocalcaemia and rickets, viral diseases, fever associated with general diseases were observed in this study as determinants of DDE (80 ). DDE results depend on the timing, severity and duration of action etiologic factor that influences a particular stage of dental development. Host susceptibility should not be neglected so that the same factors determine different manifestations in different individuals. Etiologic diagnosis is generally difficult to put only after the clinical appearance of lesions, so that the data available from family history, family tree, personal history can turn to a potential etiologic factor. Data from X-ray can show the presence of tooth or neerupti or spontaneous resorption relative contrast between SD where mineralization defects and is supported by clinical observation.
The differential diagnosis must be made between DDE extrinsic defects localized with chronological and genetic origin. Tooth structure is formed over a period of time and any existing anomaly at a time is recorded at microscopic and macroscopic sometimes observable (81).

Differential diagnosis can be genetically transmitted DDE driven by a number of existing observations of similar lesions in family members, the pattern of tooth damage - all teeth are affected in the same way, the distribution of chronological or medical history. Genetic diagnosis is a method used only in research. In clinical practice even after a thorough investigation of the family and medical history remain a number of cases that can not be diagnosed in the absence of additional laboratory methods and especially accessible.

Genetic counseling may be utilized carefully because phenotypic forms are varied and the type of transmission is not always clear whether there is access to molecular identification techniques in families with affected people. Given the physical and psychological impact of illness, type of transmission possibly observed with family tree research, genetic counseling should not be avoided.

Opacities is a qualitative defect of the E matrix mineralization disturbances secondary to dental hard tissue and the hypoplasia is due to a defect in the formation of organic matrix - quantitative defect. Poor mineralization changes the color and translucency E presenting a superficial layer intact at the time of eruption, but porosity below this layer may cause secondary trauma Fractures chewing and can be confused with hypoplasia. E hypoplasia has thick opaque or translucent appearance reduced. The same etiological factor can cause both damage depending on the time, its duration and severity and susceptibility body (80).

Opacities caused by excessive ingestion of fluorinated substances in drinking water, toothpaste, mouthwash or administered in oral health programs to prevent dental caries can be variable - mild to severe forms: initially presented intact surface E, but porous sub-surface and then opacities and add it pigmentatează posteruptivă fracture secondary to masticatory forces E (80). Opacities regardless of tooth surface area expansion has often colored horizontal bands corresponding to periods of increased intake of fluoride intense or chronological distribution - Lack of premolars or M2P. Traumatic factors (Fig. 7b.) And infections periradicular of TT (fig. 7a) are some of the factors most commonly found in etiologia opacities located in the PT.

Medical history shows water consumption nectarizate sources - wells, surface water in rural or industrial waste areas often inhabited by
families with low socio-economic level, substance use to prevent cavities, but also vicious habits in childhood related toothpaste ingestion (fig. 15).

Hipomineralization of dental fluorosis was produced by intermittent exposure to fluoridated water from natural sources.

Chronological distribution is easy to follow if hypoplasia association with a local or general etiologic factor family generally known by the impact at a time on the child's general health. Unlike hypoplasia are genetically transmitted teeth are affected by limited portions of the state of development appropriate action when etiologic factor. Clinical areas observed linear or fissures with available third horizontal incision in the incisors, canines M1P and sometimes when damage occurs in the first 2 years of life (82). There are disorders range from simple defects in the orientation of apatite crystals to massive structural disorder associated with variable changes in staratul dentine. Feature is the simultaneous presence of SD lesions with synchronous and similar in intensity dependent location when action etiologic factor. Such structures are mineralized dental rhythmically from the free edge to package and depth to the surface E and the surface to depth D, early disruption of a group dental amelogeneza is located in the incised edge - top cusps and are deep and shallow S D, and the late disturbances are visible on the surface S and dental package, but the depth of the lesion in area D. Extending the duration of the etiologic factor action, selective damage to dental groups are specific to each type of dental odontogenezei distinct (83).

Disorders of birth M1P structure changes (fig. 8), and the central incisors affects the first year senior, central and lateral incisors lower, upper and lower canines cuspizii (fig. 11-13). The first year is the most sensitive age during this period focuses most of the DDE, the most common being Deficiency rickets and nutritional regime, as observed in the study population of low socioeconomic status (fig. 12-13). Subsequently affected the upper lateral incisors and first prelolari and after the age of 2 premolares and M2P (fig. 9-10), infectious diseases stakeholders as contagious or endocrine disorders (parathyroid) (83).

A number of opacities with idiopathic origin were observed by Koch (80) to M1P, cited possible causes can be systemic or environmental toxins - poliillogenate aromatic hydrocarbons, dioxins and dibenzofurans, which can be transmitted through breast milk (84), antibiotics (85).

Sdr. MIH is a disease associated with idiopathic nature hipomineralizarea at one or more similar M1P damage associated with permanent incisors (86). Defects are variable in color demarcated opacities sometimes associated with fracture of the posteruptive hypomineralized E
but well defined normal E (87). Possible cause may be a condition pre-neo-
post-natal, low birth weight, consumption of antibiotics and toxins
associated with breast milk (88), hypoxia, hypocalcemia (fig. 8), the mother
or infant pyrexia (88.89). Varying degrees of damage to M1P and incisors
shows that not all teeth are equally susceptible to DDE, so that when action
should be taken into account etiological factor or genetic factor (87).

Amelogenesis imperfecta comprises a series of clinically
heterogeneous genetic DDE transmitted without affecting teeth and without
other systemic manifestations (90). Transmission can be achieved:
autosomal dominant - possible in males with 50% probability of
transmission from person-to-child affected, clinical forms were similar in
both sexes, autosomal recessive - 25% probability of transmission from
person-to-child affected with frequency higher in inbred families. X
chromosome linked transmission is not possible in males, but females of all
persons affected father are carriers of the gene which makes the probability
of gene in male children of carrier mothers to be 50%. Males have more
severe clinical forms than females, which are variable manifestations of
their absence due to severe lionizare phenomenon (82,91).

Classification proposed by Witkop based AI phenotype and type of
transmission has four types whose production has been identified involving
four genes (90). Gene mutation that controls AMELX most abundant
protein in the developing MB of E determines S deficient quantity-
hypoplastic AI or mineralization defects of OM - AI hipomaturată (92,93),
and gene mutation ENAM also encoding a protein of the extracellular
matrix causes a variety of forms of AI hypoplasia (94,95). Latest studies on
genes that regulate KLK4 and MMP20 proteinases involved in a series of
MO degradation show that their mutation causes defects in mineralization
or maturation of the E - pigmented amelogenesis imperfecta (96,97).

Most cases are caused by gene mutations with autosomal dominant
ENAM, 5% of cases by mutations linked AMELX transmitted X
chromosome and the other in other cases get results through novel
mutations of these genes in people who had no history family related to AI.
In a study conducted in Sweden, 63% of cases were transmitted autosomal
dominant (98) and in a study of the Middle East, the most common type of
autosomal recessive amelogenesis imperfecta imperfecta has been sent (99,100).

Autosomal dominant hypomineralized amelogenesis imperfecta is
the most common form in North America, but the molecular etiology is
unknown at present. Studies have ruled out all known mutations to date
(tuftelina, enamelina, ameloblastina, kalicreina 4, enamelisina) (101,93).
Formation occurs due to hipomineralized amelogenesis imperfecta faulty dental matrix in the context of the normal formation of dental matrix. Defect usually does not affect the uniform teeth arch, but is often bilaterally symmetrical. Organic matrix afectaţii severe teeth have relatively normal, but is soft and friable, rapidly lost through attrition so that the teeth have only 10-12 years exposed dentine which is extremely sensitive to the physical, chemical or mechanical in oral cavity, after rash to become brown-brown pigmentation due to food (fig. 14).

The effect of environmental action and genetic etiologic factor depends on the timing, duration and intensity and individual response - reactivity patient dental type, or individual cells affected cell type (80).

**III.5. CONCLUSIONS**

1. There were significant differences between children with and those without DDE by mother's education, socio-economic status or smoking, but there were no significant differences according to maternal age at birth or the number of pregnancies.
2. 10% of children were born prematurely and 89.9% of them developed DDE.
3. Children with DDE had an average gestational age weight at birth and significantly lower than that of children without DDE (p <0.001), mean gestational age was statistically significantly lower in the group with the children compare with group without DDE.
4. Significant frequency of diseases encountered in children with group average socioeconomic status than those without DDS DDS was noted only at the level of persistent viral infections in acute upper respiratory tract, in children with low socioeconomic status have significant reports met for several diseases in which the strongest were for temporary dental trauma.
5. Disease association of his antecedents classified types of DDS modified DDE index in the entire group studied, the most frequently observed in relation to diffuse opacities compared with the demarcated opacities.
6. The risk of development of enamel defects due to consumption of antibiotics in relation to associated diseases is performed for a large part of the general conditions of his antecedents, the maximum - 24.98 recorded in combination with neurological disorders.
7. Penicillin V and amoxicillin were the most commonly used antibiotics.
CHAPTER IV

STUDY OF ANTIBIOTICS EFFECTS ON DEVELOPMENTAL ENAMEL DEFECTS ETIOLOGY

Treatment with various medicinal substances during pregnancy and breastfeeding is a risk factor for both mother and child. The benefit of this therapy is being developed constantly in balance with the risks to which it is subjected to child (102, 103).

There are few medicines known to interfere with dental hard tissue formation, among them antibiotics were associated with sdr. MIH (incisor-molar hipomineralization) (66,75,49) or fluorosis similar lesions affecting the organic matrix mineralization in the first years of life (104). β-lactam antibiotics prescribed for common childhood infections - otitis media - were considered low risk medicinal substances to the fetus or small child. However, it is found that amoxicillin, penicillin or cephalosporins interfere with embryonic kidney development in function of dose Surin suggesting that these antibiotics can be toxic morfodifferentiation stages of organs and teeth (105).

IV.1. STUDY PURPOSE

Our aim was to study in clinically and histologically the effects of common antibiotics - amoxicillin, penicillin, cephalosporins and macrolides and their association with DDE for evaluation of possible morphological changes in secondary administration of beta-lactam antibiotics and macrolides in the first four years of the life of child and side effects amoxicillin induced on enamel in experimental animals.

IV.2. MATHERIAL AND METHODS

IV.2.1. Clinical study

The study group comprised 1006 children aged 5-18 years, 541 boys (53.8%) and 465 girls (46.2%) from Iași and Târgu Frumos. Mean age 12.88 ± 3.59 years and 66.8% low socio-economic status. 334 children were from urban areas with average socio-economic status - school "Ion Ghica" in Iasi, school years 2007-2009 and 672 children in urban areas with low socio-economic status (institutionalized) in Placement centers in Iași and Târgu Frumos in 2009-2010.

Before beginning this study of children's parents and teachers were informed of its purpose and were knowingly consent mandate and informed, written and signed. It was necessary to obtain consent to conduct
research education institutions and teacher support for this study. Not included in the study were children who did not receive consent from parents / guardians and have signed consent form knowingly informed and empowered, written and signed.

The children were evaluated in natural light without drying or washing prior to teeth. Complementary explorations clinical examination consisted of photographic examination (camera Canon G9). The necessary data quantifying antibiotic consumption were extracted from patient records were available and where the questionnaire completed by parents who said antibiotics administered in the first four years of the life of the child (amoxicillin, penicillin, cephalosporins, macrolides).

Data were processed using statistical functions of EpiInfo, Excel (Microsoft Office), SPSS Statistics 16 and 8 using non-parametric test of materiality $\chi^2$ with generally accepted 95%, $p < 0.05$.

**IV.2.2. Histological study**

PT were processed (n = 6) extracted following coronary injuries with fractures and a molar in extracted for orthodontic purposes from a series of six children who had a history of disease requiring treatment with amoxicillin only. Following the anamnestic examination we detected other antibiotics during 1-4 years.

PT were prepared for microscopic examination by tooth grinding fresh or dried, skimmed. There has been 1-2mm thick sections with diamond cutting unit adapted to dental water cooled to minimize loss of organic matter. Subsequently, the pieces obtained were manually polished with fine abrasive stones or a powder carborundum, involving section moving with a cork, gently press it taking care to keep wetting with Xylene. When sections reach thicknesses of 4-5 micrometers washed in several baths of Xylene and mounted in Canada balsam.

Histological sections were evaluated in light microscopy (Eclipse 600 optical microscope), they take photos with Nikon DN100 camera and Lucia software Net through 1.16.2.

**IV.2.3. Experimental study**

**IV.2.3.1. Experimental animals**

Research has been conducted on laboratory mice Swiss, aged 1 day, which were left to adapt to environmental conditions 48h with free access to water and food.
IV.2.3.2. Ethics of animal experimentation

In all procedures must be applied to methods of general anesthesia, analgesia or other methods designed to reduce possible pain and distress suffered by animals. Exceptions are cases where pain reduction methods interfere with research results and the painful stimulus applied to the animal does not produce its physiological status changes (art. 8) (106). Currently, special emphasis is placed on reducing the number of animals used for experimentation, research redefining procedures to relieve pain laboratory animals and replace animal models with alternative methods such as mathematical models and tissue cultures.

IV.2.3.3. Experiment setting

The 30 animals were distributed initially in the same cage mothers and subsequently separated each parent with their offspring and were marked color for each day of testing (tab. 14).

<table>
<thead>
<tr>
<th>Lot</th>
<th>Active substance administered</th>
<th>Administration period</th>
<th>dose (mg/kg/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (n=5)</td>
<td>Martor</td>
<td>Day 5-10, Day 12-17</td>
<td>-</td>
</tr>
<tr>
<td>2 (n=6 )</td>
<td>amoxicillin</td>
<td>Day 5-10, Day 12-17</td>
<td>7</td>
</tr>
<tr>
<td>3 (n=5)</td>
<td>amoxicillin</td>
<td>Day 5-10, Day 12-17</td>
<td>10</td>
</tr>
<tr>
<td>4 (n=5)</td>
<td>amoxicillin</td>
<td>Day 5-10, Day 12-17</td>
<td>12</td>
</tr>
<tr>
<td>5 (n=4)</td>
<td>amoxicillin</td>
<td>Day 5-10, Day 12-17</td>
<td>15</td>
</tr>
</tbody>
</table>

It was constituted a control group of six conspecifics that was not made any administration of medicinal substances (a female chicken 5). Experiment animals were Swiss laboratory mice, male and female from the age of one day, with average body weight of 4g (± 1g) and housed in a temperature-controlled room (22°C ± 2°C), with a 12-hour cycle light/12 dark hours in separate cages each corresponding female offspring (1 +5 / 1 +6 / 1 +5 / 1 +5 / 1 +4). The animals were allowed to adjust before testing 48 hours with access to water and food for the mother. Test substance (amoxicillin trihydrate) was dissolved in 0.1 ml saline / dose and administered by gavage every 12 hours.

Animals were euthanized by lot, at the end of testing, using the chemical agent ether euthanasia.
IV.2.3.4. Histopathological examinations

Histological examination was performed following prelevatelor tissue surgery techniques for obtaining the permanent preparation by including paraffin histology.

IV.3. RESULTS
IV.3.1. Clinical study

Depending on the presence of DDE children were divided into two groups: group with DDE - 99 children (9.8%), group without DDE - 907 children without DDE (90.2%).

Looking antibiotics to children in groups "Ion Ghica" and "Placement" in the first four years of life, depending on the type of defect is observed that opacity and hypoplasia associated mainly amoxicillin and penicillin were used, no significant differences statistically ($\chi^2 = 1.36$, GL = 2, p = 0.506) and number of teeth with opacity or hypoplasia was associated both with the use of penicillin and amoxicillin without a significant difference statistically between them ($\chi^2 = 1.41$, GL = 3, p = 0.704).

In the entire study group (n = 1006), antibiotics were administered at a rate of 16.2% in the first year, 36.2% in the first two years, 56.6% in the first 3 years and 80% the first 4 years.

20.1% of children have not taken any antibiotic, and 68.5% received two or more different antibiotics. Penicillin V and amoxicillin were the most commonly used antibiotics. During the first year of life, 21.6% of children were treated with penicillin or amoxicillin or both. Of 99 children with DDE, 25 (25.3%) took antibiotics during the first year of life, compared with 138 of the 907 children (15.2%) without DDE (p = 0.015).

DDE association with antibiotics in the first year of life revealed a relative risk of 1.66 times higher (RR = 1.66, CI95%: 1.14 ÷ 2.41), that after 4 years to reach a risk management relatively more than two times higher (RR = 2.18, CI95%: 2.02 ÷ 2.36) (tab.15).

DDE risk because of the antibiotics administration in the first 4 years of life was statistically significant.
TABLE 15. The risk of development of enamel defects due to consumption of antibiotics in the first four years of life

<table>
<thead>
<tr>
<th>Life years</th>
<th>Antibiotics consumption</th>
<th></th>
<th></th>
<th>RR</th>
<th>IC95%</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Child with DDE n</td>
<td>%</td>
<td>Child without DDE n</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>2,5</td>
<td>138</td>
<td>13,7</td>
<td>1,66</td>
<td>1,14±2,41</td>
</tr>
<tr>
<td>2</td>
<td>64</td>
<td>6,4</td>
<td>300</td>
<td>29,8</td>
<td>1,95</td>
<td>1,64±2,32</td>
</tr>
<tr>
<td>3</td>
<td>89</td>
<td>8,8</td>
<td>480</td>
<td>47,8</td>
<td>1,70</td>
<td>1,55±1,86</td>
</tr>
<tr>
<td>4</td>
<td>97</td>
<td>9,6</td>
<td>707</td>
<td>70,4</td>
<td>2,18</td>
<td>2,02±2,36</td>
</tr>
</tbody>
</table>

IV.3.2. Histological study

Case I - MP, male, 17 years-old, Iaşi.
AHC – insignificant; AP – whooping cough (pertusis) 5 months associated with treatment with amoxicillin; APS – insignificant.
Facial examination – normal.
Endooral examination – dento-alveolar crowding, deep palate, maxillary left M1P, right mandibular M1P shows extensive crown-root destruction. Following preparation for orthodontic treatment the mandibular left M1P was extracted from approximately horizontal-buccal position position and periodontal gr.3 mobility.
Histological examination: superficial E surface has variable thickness, with hypermineralized areas in the third external area of middle cuspal E; at the surface are observed deep cracks with penetration both in E and dentin (Fig. 16).

Case II – AP, male, 18 years-old, Iaşi.
AHC – insignificant; AP – leptospirosis at the age of 3 years related to treatment with amoxicillin; APS – injury by falling in the right upper jaw.
Facial examination – normal.
Endooral examination – maxillary right M1P with dismorphic aspect, increased abrasion unspecified for this age (18 years-old). No other erosions are associated with other teeth, but its indicated an injury by falling in that area at the age of 2 years-old.
Fig. 16. Molar (MP). a) Longitudinal section of the distal-buccal cusp – occlusal view (slif X 0,5); b) Overview of the cervical area (slif X 0,5); c) E with clear demarcation zone (slif X 2); d) Hypermineralised area in external third of medium E (slif X 4); e) Cuspal area showing the different dimensions of intensely mineralized E, following administration of amoxicillin (slif X 4); f) Differences in mineralization and apparent crack penetrating to ADJ in the middle crown area (slif X 4).
Fig. 17. Molar (AP). a) Longitudinal section the DISTal-buccal cusp - overview occlusal area, E inequality with different areas of mineralization (slif X 2); b) Continuous line between areas of different degree of E mineralization (slif X 2); c) Detail demarcation line (slif X 10); d) Detail demarcation line (slif X 20); e) ADJ and multiple cracks present (slif X 10); f) Hunter-Schreger bands evident in the third internal and middle crowne area (slif X 10); g) Prisms with varying degrees of mineralization (slif X 20); h) Prisms with similar degrees of mineralization (slif X 20).

**Histological examination:** There was fractured tooth surface largely remained only a few fragments in the cervical area which cracks up
the deep layer of E, there is no continuity in third external part of medium E is the result of surface fracture in E. E has uneven thickness, with a clear delineation between the third and the middle E third of its external (different degrees of mineralization), cracks and extensive full thickness strips E (fig. 17).

Cazul III – PS, female, 18 years-old, Iaşi.
AHC – insignificant; AP – acute pyelonephritis associated with treatment with amoxicillin at the the age of eight months; APS – central incisor fracture and traumatic pulp necrosis.

Facial examination – normal.
Endooral examination – upper left central incisor with traumatic fracture and pre-existing pulp necrosis. Secondary caries in the maxillary and mandibular M1P.

Fig. 18. Incisive (PS). a) Longitudinal section - overview of the buccal area (slif X 0,2); b) E tufts near ADJ (slif X 4).

Histological examination: E is fractured in the incisal area, unevenly with different areas of mineralization, and surface has many tufts as an expression of mineralization defects (fig. 18). The general appearance is quite normal.

Case IV – BA, male, 18 years-old, Iaşi
AHC – insignificant; AP – pneumonia at the age of 1 year related to treatment with amoxicillin; APS – lower central incisor with traumatic fracture.

Facial examination – normal.
Endooral examination – mandibular central posttrauma incisor fracture with buccal position and dental-alveolar crowding, deep periodontitis and mobility gr.2-3.
Fig. 19. Incisive (BA). a) Longitudinal section – buccal area third middle crown, third external medium E with varying degrees of mineralization, more pronounced in cervical area (slif X 2); b) Longitudinal section - the buccal cervical area (slif X 2); c) Areas with obvious Retzius band and areas E zone next to Retzius bands (slif X 4); d) Detail Retzius bands (slif X 10); e) ADJ, internal aprismatic E (slif X 10).

**Histological examination:** S is broken in the palatal and incisal area, third external of middle E have varying degrees of mineralization, more pronounced for cervical area, where Retzius bands path is interrupted. E areas with Retzius bands areas are adjacent to defects mineralization
area (medium 1/3), where the Retzius bands are absent. Third internal E of middle E looks normal (fig. 19).

**Case V** – FA, male, 18 years-old, Iași.  
**AHC** – insignificant; **AP** – multiple episodes of acute bronchitis by the age of 1 year related to treatment with amoxicillin; **APS** – Traumatic M1P fracture with interposition of foreign body.  
**Facial examination** – normal.  
**Endooral examination** – M1P traumatic fracture with deployment of mezio-lingual part.

![Images of the molar with various sections and details](image)

**Fig. 20.** Molar (FA).  
**a)** Longitudinal Section - cusp (slif X 2);  
**b)** Cusp slope with evident discontinuities in third external area of superficial and middle E (slif X 2);  
**c)** Detail cusp slope (slif X 2);  
**d)** Prismatic aspect (slif X 10);  
**e)** Prismatic aspect (slif X 20).

**Histological examination:** Cusp shows marked inequalities of E layer consecutive to traumatic fracture and evident discontinuity in the external third of medium and superficial E. The occlusal area presented multiple tufts and increased pigmentation in middle half of E (fig. 20).
Case VI – RO, female, 18 years-old, Iași.

AHC – insignificant; AP – pneumonia and chronic bronchitis with onset in infancy to age 4 associated with multiple treatments with amoxicillin; APS – right mandibular lateral incisor fracture with interposition traumatic foreign body.

Facial examination – normal.

Endooral examination – right mandibular lateral incisor fracture with traumatic fracture and detachment of coronary fragment, untreated multiple caries.

Fig. 21. Incisive (RO). a) Longitudinal section - the buccal cervical area (slif X 0,5); b) Longitudinal section - the bucal middle third of the crown (slif X 0,5).

Histological examination: E surface is thinned with dense tufts on the junction of dentin. Areas with normal mineralization alternate with hipermineralized area of the external third of medium E, best represented in the cervical than in the middle crown area. Mineralization defects prevail in external E area and less or absent in the internal third of internal or medium E (fig. 21-22).

IV.3.3. Experimental study

IV.3.3.1. Normal aspects of mice dentition

Interpretation of various deviations from normal morphology induced by amoxicillin was made vis-à-vis the normal aspects of the teeth seen in mice in the control group (n = 6).

Braces mouse incisors and molars consists of: incisors are hipselodont (still growing), two on each arch. Quadrangular prism-shaped and covered all over with glaze. Missing canines, very long diastema. Molars are the teeth and cylinder form, short neck and face chewing increases the transverse enamel, except the last molar that has a rectangular prism-shaped (107).
IV.3.3.2. Animal study

Enamel was present in 9 of these 10 incisors harvested from the control group, and if the lot that received amoxicillin, S was visible in all mice. When teeth come from animals that have made administration of 7 mg / kg / day was not observed structural changes of S or its thickness was not affected. If administration of 10-15 mg / kg / day was significantly increased thickness of S to the control group (tab 15). No higher doses could be associated with phenomena as diarrhea and increased intolerance to the live animal per os administration.

Fig. 22. Incisive (RO). a) ADJ looking like "fish scales" and hypermineralization of the external third of middle E (slif X 2); b) ADJ cervical area lokking like "fish scales" şi and hypermineralization areas (slif X 2); c) Detail cervical hypermineralized area, demarcation limit between two zones of mineralization difference S, lamelle andand cracks (slif X 10); d) Detail mineralization zone differences, Retzius striae visible
(slif X 10); e) ADJ, internal aprismatic E, internal third of middle E without mineralization defects (dinte slif X 10); f) Detail ADJ (slif X 10).

No evidence of structural changes at both S and the dentine in the administration of doses similar to those used to treat severe infections in children, but the S layer thickness measurements have shown significant differences between the speed of its formation in animal teeth who received amoxicillin compared with those in the control group (fig. 23-27).

If incisors values ranged between 90-110nm wide incised double compared to the control values (56-63nm) and the molars in the occlusal thickness ranged from 7.5 to 17.5 nm compared to the control (3.5 - 5nm) directly proportional to the dose of amoxicillin administered per kg body weight compared to the control (3.5-5nm).

**TABLE 15. Enamel layer size in the control group (mininme values and maximum)**

<table>
<thead>
<tr>
<th>Enamel layer size (nm)</th>
<th>Dental type</th>
<th>Incizal/Occlusal</th>
<th>Lateral</th>
<th>Cervical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Martor- Incisive</strong></td>
<td>Min</td>
<td>56</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>63</td>
<td>18</td>
<td>3,5</td>
</tr>
<tr>
<td><strong>Incisive</strong></td>
<td>Min</td>
<td>90</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>110</td>
<td>23</td>
<td>5,5</td>
</tr>
<tr>
<td><strong>Martor - Molar</strong></td>
<td>Min</td>
<td>3,5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Max</td>
<td>5</td>
<td>1,5</td>
<td>0,5</td>
</tr>
<tr>
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<td>Min</td>
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<td>5</td>
<td>2,5</td>
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<td></td>
<td>Max</td>
<td>17,5</td>
<td>12,5</td>
<td>5</td>
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</tbody>
</table>

In the area of the lateral incisors (vestibular or oral) between 20-23 nm size ranged slightly higher than the control (15-18nm) and the similar area of the molars thickness ranged from 5 to 12.5 nm directly proportional to the dose of amoxicillin per kg body weight administered to the witness (1-1,5 nm).

Neck at the incisors (vestibular or oral) from 5 to 5.5 nm size ranged from slightly higher than the control (2 to 3.5 nm) and the area of the molars similar thickness ranged from 2.5 -5nm directly proportional to
the dose of amoxicillin administered per kg body weight compared to the control (0 to 0.5 nm).

**Fig. 23.** a) Incisive (control mice). Oblique cross-section of the socket (Col. HEA, x100); b) Incisive (control mice): 1. Dental pulp; 2. Odontoblast; 3. Dentin; 4. Enamel; 5. Ameloblast (Col. HEA, x400).

**Fig. 24.** a) Incisive (experimental mice). Oblique cross-section of the socket (Col. HEA, x100); b) Incisive (experimental mice) Enamel development (Col. HEA, x400).

**Fig. 25.** a) Molar (control mice). Enamel barely visible (Col HEA, x100); b) Molar (control mice). 1. Dental pulp; 2. Odontoblast; 3. Dentin; 4. Developmental enamel; 5. Ameloblast (Col. HEA, x400).
Fig. 26. a) Molar (control mice). Secretory ameloblast, E as an oxifile band (Col. HEA, x1000); b) Molar (control mice) Odontogenesis. E as an oxifile band (Col. HEA, x1000).

Fig. 27. a) Molar (experimental mice) Enamel undetectable (Col. HEA, X100); b) Molar (experimental mice) Development of E and dentin (Col. HEA, x400); c) Molar (experimental mice) E as smooth films (Col. HEA, X100); d) Molar (experimental mice) Enamel development. 1. Dental pulp; 2. Odontoblast; 3. Dentin; 4. Enamel; 5. Ameloblast (Col. HEA, x1000).
IV.4. DISCUSSIONS

Dental development is genetically controlled, but environmental factors acting during the evolutionary process can lead to various structural changes. Once the tooth formation, E can not undergo remodeling processes such as dentin, or bone hardened. Thus, any lifetime disorder ameloblastelor visible in the structure and form mature DDE. Systemic factors acting in the secretory phase affects the length of crystals, resulting in a thin S, hypoplasia, and disturbances occurred in intermediate stages of maturation or S form a normal thickness but poorly in terms of hardness, hipomaturat, hipomineralizat. Especially in the early stages of maturation, ameloblastele are very sensitive to environmental factors (80). M1P begin to develop in the fourth month of pregnancy, and mineralization is observed in the areas cuspidiene immediately after birth. Central incisors and upper and lower lateral incisors begin mineralization inferior to 3-4 months after birth, and upper lateral incisors in 10-12 months postnatally. Around the age of six months, M1P cuspizii unite the first year of life is full matrix submission occlusal half crown and begin its maturation. Formation of the entire layer of S lasting up to 3-4 years for lower M1P up to 4-5 years for other central and lateral incisors M1P and, two thirds of this is dedicated to the maturation stage. Thus for M1P and permanent incisors first year of life coincides with the first phase of maturation, but takes place over a long period of time - several years so that increases the risk of exposure to a range of external factors that can lead to the development of DDE (83).

Jälevik B et al. demarcated opacities M1P correlates to a systemic factor by affecting one or more teeth, and general conditions related to antibiotic consumption may be a causal factor (66,70).

Bentjes et al. suggests that diseases in the first four years of life, such as otitis media, upper respiratory tract disease, pneumonia (75), urinary tract infections (72) or treatment with antibiotics are associated with DDS (75). Hall poor general health associated with increased likelihood of developing DDS (108).

It is unclear whether the causal factor of DDE is the disease itself or drugs used to treat it. Frequent childhood infections as in most other specific conditions are associated fever period that can cause disturbances in amelogeneză alone. An experimental study of Tung et al., Show that turpentina - pyogenic exogenous, acted for 57 hours increased average body temperature of mice with 1,5⁰C experience, and therefore produced a radiolucent line parallel to the growth of S hipomineralizat the incisors (109).
The link between antibiotic use and DDE treatments was observed frequently during use tetracycline because of obvious color changes S, and in recent years have made connections between a number of antibiotics commonly used in clinical practice and hipomineralizate lesions described in sdr. MIH, also noting the impossibility decelării between causal factors given disease or antibiotic therapy (66,75,49,110).

Amoxicillin use during the first year of life increased the risk of incisor-molar hipomineralizărilor (110) or similar defects fluorosis in permanent incisors and M1P (104) and in the study by Whatling and Fearne - sdr. MIH was more common among children who received treatment for drug amoxicillin during the first 4 years of life, but not in children with joint administration of antibiotics including amoxicillin (49). Another study shows that prevalence did not differ hipomineralizărilor children who received amoxicillin during the first three years of life and those who did not receive (72).

Hong et al. suggest that amoxicillin use is associated with fluorosis in incisors and DDE similar M1P. The results of investigation of 579 children shows that its use during childhood seems to be little related to dental fluorosis developed on both molars and incisors receive permanent maxillary central. Life of the antibiotic was linked to the number of premature erupted DDE - PT similar to fluorosis. By the age of one year, three quarters of subjects had used amoxicillin, and up to 32 months, 91% of participants were treated with this antibiotic. They concluded that fluorosis similar defects were common in children with early use of amoxicillin, especially in the first 6 months. Overall, 24% of children had fluorosis on both maxillary central incisors. Amoxicillin use from three to six months doubled the risk of dental fluorosis "significantly increased risk for dental fluorosis associated with amoxicillin use during early infancy was found at all levels of statistical analysis, even after controlling other risk factors such as fluoride intake, otitis media or infections such as breastfeeding "(104).

Laisi et al. studied the effects of varying concentrations of amoxicillin with 100μg/ml - 4mg/ml to fully exploit the mouse embryo, from day 18 - the corresponding start matrix secretion for 10 days. Was shown to affect ameloblaștilor subjected to high levels of antibiotic by inhibiting the maturation stage of their specific transformation so that mineralization pattern is changed due to damage ameloblastice transformation (110).

The same authors erythromycin associated with increased risk of developing persistent hipomineralizărilor to M1P and administration in the
first year of life (110). An increased risk for M1P signal and another study when administered in the first three years of life (72).

An experimental study on the effect of macrolides on the development of DDE in rats consecutive doses of oral antibiotics of 5,000 mg/kg/day for 5 weeks, shows that changes occur in stages ameloblastelor the transition to maturity and those maturation of matrix. Authors reveals new bands hipomineralizare incisors at 4 weeks (111).

Looking antibiotics in the first four years of life depending on the type of DDE is observed that the association of opacity and hypoplasia was achieved mainly with amoxicillin and penicillin, without differences statistically significant, except the lot "Placement" in the second year life when opacity or hypoplasia have been associated with use of both penicillin and amoxicillin to \( \chi^2 = 1.12, \text{ GL } = 3, \ p = 0.771 \) and number of teeth with opacity or hypoplasia was also associated with the use of penicillin and amoxicillin \( \chi^2 = 1.41, \text{ GL } = 3, \ p = 0.704 \).

Laisi et al. conducted a clinical trial is that the prevalence of 16.3% DDE. DDE were more common in children who received amoxicillin medication \( \text{hazard ratio } = 2.06 \) and erythromycin \( \text{hazard ratio } = 4.14 \) compared with those not taking these antibiotics in the first year of life, 15% of children have not taken any an antibiotic in the first four years of life and 43% received two or more different antibiotics. Penicillin V and amoxicillin were the most commonly used antibiotics. During the first year of life, 34.8% of children taking either penicillin or amoxicillin or both. DDE was recorded in 23 children (16.3%), of which 52.2% had taken antibiotics during the first year, compared with 33.9% of children without DDE \( \text{p} > 0.05 \). DDE were more common among children taking amoxicillin \( \text{hazard ratio } = 2.06 \) or erythromycin \( \text{hazard ratio } = 4.14 \) than in those not taking these antibiotics in the first year of life. The relative risk for DDS after exposure to penicillin V was 1.71 (110).

In our study there was a slightly higher number of children who have not taken any antibiotics in the first four years of living - 20.1%, but significantly more than children who received treatment with two or more antibiotics - 68 , 5%.

It was found that penicillin V and amoxicillin are the antibiotics most commonly used in the first year of life, 21.6% of children were given either penicillin or amoxicillin, or both compared with 34.8% of children consider the Finnish study, which was associated with lower prevalence of DDE - 9.8%.

A quarter of children with DDE (25.3%) took antibiotics during the first year compared with 15.2% of children without DDE \( \text{p} = 0.015 \),
values which are directly proportional to the lower prevalence of DDE in group study compared with values reported by the Finnish study: 52.2% of children taking antibiotics DDE during the first year of life, compared with 33.9% of children without DDE (p> 0.05).

Do not forget that common infections early in life - chronic otitis, eruptive fevers have a short-time action, so that the lesion produced may not be visible to a routine. Etiologic factors ameloblastelor sensitivity is higher in the early stages of mineralization, but it is equally its concentration. Suga et al. conducted a study on animal model - simian, showing that both hipomineralizarea and hypoplasia occur in the dental buds are late secretory stage or early stage of maturation at 2 weeks of action of systemic etiologic factor (112).

It is unclear whether the disease itself or the treatment of DDE is the etiological factor and the action can amount factors so it is difficult to study in vivo effects of several different factors. In vitro study allows the study of each factor or several factors simultaneously, and Salmela et al. shows that if the two known factors that separate low effect on development and summing up the effects is unclear (113). Histological study conducted on a number of PT unrecoverable or copy in orthodontic treatment who received antibiotics during the first exclusive four years of life showed areas hipermineralizar the average third and middle third of S corresponding external external conditions such products during the maturation of S corresponding to both permanent molars and incisors for. In the latter case there were a summing up of potential etiological factors producing insidious onset of mineralization defects appear so many bushes the ADJ, but also damage to the external area S. Experimental study of Laisi et al. to fully exploit mouse embryonic teeth in culture medium exposed to amoxicilllin showed that S formation was stimulated, but had no effect on the formation of dentin. After 10 days in culture, S was present on all molars exposed to amoxicillin with a high concentration (4 mg / ml) but was present in only one third of the teeth in the control group and exposed to low levels of amoxicillin. Where E was visible - in the control group or molars exposed to 100 mg / ml amoxicillin, it was thinner than that observed in teeth subjected to concentrations of amoxicillin ≥ 1 mg / ml (110).

In our study conducted on laboratory animals for administration of 10-15 mg/mg/ ay amoxicillin thickness E was significantly higher than controls, so that we could confirm the results obtained by Laisi et al. stipulated that after an in vitro study that amoxicillin accelereză training and so we can assume that this antibiotic induces earlier E and / or
accelerate its rate. Lowest concentration of amoxicillin was similar to that commonly used treatments in children.

Amoxicillin may interfere with function or accelerates ahead amelogenesis. This model can explain amelogenezei disturbance sequence (correct temporal relationship between the matrix and proteolytic degradation during secondary growth of crystals that leads to the production of hypomineralized E).

Disruption amelogenezei, proteolytic degradation of the relationship between matrix and the period of crystal growth that leads to production of fully mineralized E production could explain hipomineralizare lesions.

IV.5. CONCLUSIONS

1. Antibiotics in the first four years of life depending on the type DDS, opacity and hypoplasia mainly associated with amoxicillin and penicillin, without significant differences, except for the second year of life.
2. Penicillin V and amoxicillin were the most commonly used antibiotics.
3. DDS association with antibiotics in the first year of life revealed a relative risk of 1.66 times that after four years of administration to reach a relative risk of over 2 times higher.
4. At doses of 5-15 mg / kg / day thickness of the teeth extracted S from experimental animals was significantly increased.
CHAPTER V

PSYCHO-SOCIAL RELEVANCE OF PERMANENT TEETH DEVELOPMENTAL ENAMEL DEFECTS

Patients, parents and dentists have a different aesthetic representation of the outcome of treatment carried out due to the aim pursued by each of the parties involved and the personal power of individual perception of it.

V.1. STUDY PURPOSE
DDS investigation in urban pediatric population in Iasi and psychosocial impact assessment of their child, parents and medical examiner.

V.2. MATHERIAL AND METHODS
The study group comprised 1006 children from urban areas - Science and guards. of which 334 children were from urban areas with average socioeconomic status - school "Ion Ghica" in Iași, school year 2007-2009 and 672 children in urban areas with low socioeconomic status - placement centers in Iasi and guards in 2009-2010. The study group was divided into two groups according to socio-economic status.

The first phase was carried out a questionnaire which has three parts for perceived dentist, parents and children about child dental aesthetics, the questionnaire was completed two standardized dental arch images front and one with "happy tooth" to asked the coloring according to the child's opinion vis-à-vis the ideal appearance of the teeth and the child's perception of a "happy tooth". Children were asked drawings available with autoportete aesthetic ideal for refining the analysis of children. In phase II clinical examination and photography was done in the third phase were evaluated for DDS teeth.

Quantification was achieved by aesthetic perception:
• assessing the overall dental health
• general dental appearance
• the appearance of front teeth
• reaction of parents / relatives on the appearance of teeth in general and in particular teeth prior
  • interrelation of these factors with social activities and psychological comfort DDE was used for classification modified DDE index.

The children were evaluated in natural light without drying or
washing prior to teeth. Ideally, teeth should be dry at the time of examination, cleaning and storage of pigments as soft real tooth surface exposed so that you can see hidden defects that can escape from a routine clinical examination. Clinical examination was performed by one dentist (MRM) with current dental instruments (probe, forceps, dental mirror), with detailed examination of the affected areas in daylight. Tooth surfaces were visually inspected, and the suspects were explored with the probe to determine the contours and surface defects.

Data were processed using statistical functions of EpiInfo, Excel (Microsoft Office), SPSS Statistics 16 and 8 using non-parametric test of materiality \( \chi^2 \) with generally accepted 95%, \( p <0.05 \).

V.3. RESULTS
V.3.1. Esthetic perception of developmental enamel defects

Lot examined consisted of 1006 children aged 5-18 years, 541 boys (53.8%) and 465 girls (46.2%) 12.88 ± 3.59 with a mean age years. To quantify the aesthetic perception of the teeth and front teeth were evaluated senior child - with maximum visual impact and to make a choice răpuns questionnaire. To set a reference phrase "tooth color looks good" answered by children, parents and doctors examiners. They have indicated agreement or disagreement with the statement by reference using one of the responses indicated, 1 = "very satisfied" 2 = "satisfied" 3 = "acceptable" 4 = "dissatisfied" and 5 = "unacceptable" (114) (tab. 16).

Assumptions followed in the study were (115):
- Girls are more critical than boys on tooth color;
- Parents of girls are more critical of their child's tooth color than parents of boys;
- Older children are more critical of dental appearance than younger children;
- Parents of older children are more critical than parents of young children dental appearance;
- Dentist dental appearance is critical to older children than in young children;
- Your dentist is critical for dental appearance in girls than in boys.
- Parents with higher socioeconomic status are more critical than parents with lower socioeconomic status.
**TABLE 16. Aesthetic evaluation of tooth color scores (reported in reference declaration) and the reasons that led to this score**

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
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<tr>
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<td>20</td>
<td>40</td>
<td>3</td>
<td>69</td>
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<tr>
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<td>0</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>8</td>
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<tr>
<td>Fluorosis</td>
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<td>2</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Other defects</td>
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<td>0</td>
<td>2</td>
<td>14</td>
<td>6</td>
<td>22</td>
</tr>
<tr>
<td>Other reasons</td>
<td>6</td>
<td>319</td>
<td>272</td>
<td>46</td>
<td>4</td>
<td>647</td>
</tr>
<tr>
<td>Yellow colour</td>
<td>0</td>
<td>4</td>
<td>9</td>
<td>28</td>
<td>10</td>
<td>51</td>
</tr>
<tr>
<td>Cavity/Esthetic restoration</td>
<td>0</td>
<td>10</td>
<td>98</td>
<td>70</td>
<td>22</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td>341</td>
<td>404</td>
<td>207</td>
<td>48</td>
<td>1006</td>
</tr>
<tr>
<td><strong>Parents evaluation</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Opacity</td>
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<td>16</td>
<td>20</td>
<td>20</td>
<td>3</td>
<td>69</td>
</tr>
<tr>
<td>Hypoplasia</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Fluorosis</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Other defects</td>
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<td>7</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Other reasons</td>
<td>116</td>
<td>279</td>
<td>202</td>
<td>40</td>
<td>10</td>
<td>647</td>
</tr>
<tr>
<td>Yellow colour</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>30</td>
<td>12</td>
<td>51</td>
</tr>
<tr>
<td>Cavity/Esthetic restoration</td>
<td>0</td>
<td>60</td>
<td>48</td>
<td>50</td>
<td>42</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>132</td>
<td>364</td>
<td>287</td>
<td>149</td>
<td>74</td>
<td>1006</td>
</tr>
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<td><strong>Medic evaluation</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Opacity</td>
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<td>15</td>
<td>14</td>
<td>0</td>
<td>69</td>
</tr>
<tr>
<td>Hypoplasia</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Other defects</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
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<td>150</td>
<td>260</td>
<td>88</td>
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<td>647</td>
</tr>
<tr>
<td>Yellow colour</td>
<td>2</td>
<td>15</td>
<td>25</td>
<td>6</td>
<td>3</td>
<td>51</td>
</tr>
<tr>
<td>Cavity/Esthetic restoration</td>
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<td>86</td>
<td>99</td>
<td>4</td>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>157</td>
<td>290</td>
<td>411</td>
<td>122</td>
<td>26</td>
<td>1006</td>
</tr>
</tbody>
</table>

1 - Very satisfied 2 - Satisfied, 3 - Acceptable, 4 - Dissatisfied, 5 - Unacceptable.

1006 children were examined, 33.2% were from urban areas with medium socio-economic status - school "Ion Ghica" in Iasi, and 66.8% in urban areas with low socio-economic status - Placement centers Iaşi and Târgu Frumos. Of these, 53.8% were male, 46.2% were girls. 42.3% were aged 5-12 years and 67.7% were aged 13-18 years, 66.8% low socio-economic status and 33.2% had an average socio-economic status. 25.3% children disagree with witness statement, compared with 22.2% and 14.7% parent dentist evaluations. Of 1006 subjects, 14.9% were dissatisfied
with their tooth color and of these, 25.3% felt that their teeth were too yellow, 3.33% 28.6% felt that the appearance of white-Crete due to opacities and fluorosis "unsatisfactory, unacceptable" and 4.6% were bothered by the appearance of fissures hypoplasia.

In 1006 by parents, 22.2% were dissatisfied with their child's dental aesthetics. Of these parents, 18.8% indicated the yellow teeth look white-Crete 10.3% opacity and 2.2% of fluorosis as a source of discontent and dissatisfaction hypoplasia was mentioned as a rate of 2.69%.

Of the 1006 children evaluated, the dentist indicated that 14.7% subjects had unsatisfactory tooth aesthetics. He attributed this yellow color of the teeth in 9 cases (6.1%), fluorosis in 2 cases (1.4%), and Opacity to 14 cases (9.5%).

Girls (3.35%) were more critical appreciation (higher average scores) than boys (3.09%%), and these mean scores were higher than those of parents of girls (2.98%) and dentists who examined the girls (2.68%). Evaluations female children (p = 0.014), their parents (p = 0.027) but not of dentists who have consulted (p = 0.522) were more critical of tooth color. Older children were more critical than lower (p <0.0001), parents of older children more critical than those of children (p <0.0001). Evaluation dentist was critical of the color of teeth older children than younger children (t = 0.044). Demarcated and diffuse opacities children were significantly more critical than were children without DDS, but children with hypoplasia were more critical appreciation of both the dental appearance of opacities and DDS from that without (p = 0.009). Similarly, only parents of children with hypoplasia had significantly different opinions (p <0.0001). Parents of children with diffuse opacities were slightly more critical than those of children with demarcated opacities without significant. For the dentist, there were significant differences between the appearance of diffuse opacities, hypoplasia and DDS absences appearance (p = 0.011 and p <0.0001), but there was no significant difference between demarcated opacities and no injuries.

Children and parents dentist were more critical in assessing the appearance of opacity white enamel-Crete as a whole compared with dental fluorosis (tab. 17).

**V.3.2. Psycho-social impact of developmental enamel defects**

Most children were described as generally satisfactory dental appearance (odontal status) (31.6%) and that of the front teeth (29.2%). The negative aspects resulting from both general odontal status and impact of front teeth DDS presented different aspects in the two previous groups of
children affected teeth and integrity. Children generally dissatisfied with dental appearance were 5 times less in the group affected teeth prior to those unaffected by the DDS (tab. 18).

**TABLE 18. Average score and t-test value for children, parents and dentist examiner**

<table>
<thead>
<tr>
<th>Variabile</th>
<th>Medium score</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Child</td>
<td>Parent</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>3,09</td>
<td>2,16</td>
</tr>
<tr>
<td>Female</td>
<td>3,35</td>
<td>2,98</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥13</td>
<td>3,52</td>
<td>3,41</td>
</tr>
<tr>
<td>5-12</td>
<td>3,12</td>
<td>2,73</td>
</tr>
<tr>
<td>Socio-economic status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>2,70</td>
<td>3,15</td>
</tr>
<tr>
<td>Low</td>
<td>2,75</td>
<td>2,12</td>
</tr>
<tr>
<td>Modified DDE index</td>
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<td></td>
</tr>
<tr>
<td>Absent</td>
<td>2,11</td>
<td>2,32</td>
</tr>
<tr>
<td>Demarcated opacity</td>
<td>2,20</td>
<td>2,33</td>
</tr>
<tr>
<td>Diffuse opacity</td>
<td>2,09</td>
<td>2,40</td>
</tr>
<tr>
<td>Hypoplasia</td>
<td>2,96</td>
<td>3,12</td>
</tr>
<tr>
<td>The reason for dissatisfaction vis-à-vis the of dental appearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluorosis</td>
<td>3,44</td>
<td>3,33</td>
</tr>
<tr>
<td>Opacity</td>
<td>4,13</td>
<td>4,13</td>
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<tr>
<td>Hypoplasia</td>
<td>3,58</td>
<td>2,86</td>
</tr>
<tr>
<td>Other defects</td>
<td>4,18</td>
<td>2,55</td>
</tr>
<tr>
<td>Other reasons</td>
<td>2,57</td>
<td>2,30</td>
</tr>
<tr>
<td>Yellow colour</td>
<td>3,86</td>
<td>3,06</td>
</tr>
<tr>
<td>Esthetical restauration</td>
<td>3,52</td>
<td>3,27</td>
</tr>
</tbody>
</table>

Of the 1006 children investigated, responded to the questionnaire on satisfaction only 76.6% of them (tab. 19).

Of all children who responded to the questionnaire on dissatisfaction, 81.7% had a general health appropriate oral, with a roughly equal distribution according to satisfaction / dissatisfaction (p = 0.883). In terms of satisfaction of children by dental health stands accounted for 21.8% of children who have a degree of dissatisfaction unsubstantiated while 42.6% of children do not realize the poor condition satisfied health teeth (p <0.001). Acknowledges the concerns parents of children 81% dissatisfied and 33.3% of those satisfied with their front teeth appearance,
distribution statistically significant (p <0.001). Concern is perceived by external observers 66.7% of the children concerned and only 29.4% of the children look happy with the front teeth (p <0.001).

TABLE 19. **Variables associated with the appearance of front teeth dissatisfaction**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Satisfied (n=477)</th>
<th>Dissatisfied (n=294)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>312</td>
<td>65.4</td>
<td>89</td>
</tr>
<tr>
<td>Girls</td>
<td>165</td>
<td>34.6</td>
<td>205</td>
</tr>
<tr>
<td>General state of oral health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>appropriate</td>
<td>389</td>
<td>81.6</td>
<td>241</td>
</tr>
<tr>
<td>inappropriate</td>
<td>88</td>
<td>18.4</td>
<td>53</td>
</tr>
<tr>
<td>Dental health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>appropriate</td>
<td>274</td>
<td>57.4</td>
<td>64</td>
</tr>
<tr>
<td>inappropriate</td>
<td>203</td>
<td>42.6</td>
<td>230</td>
</tr>
<tr>
<td>Aware of the concerns parents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>159</td>
<td>33.3</td>
<td>238</td>
</tr>
<tr>
<td>No</td>
<td>318</td>
<td>66.7</td>
<td>56</td>
</tr>
<tr>
<td>Aware of concerns foreign observers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>140</td>
<td>29.4</td>
<td>196</td>
</tr>
<tr>
<td>No</td>
<td>337</td>
<td>70.6</td>
<td>98</td>
</tr>
</tbody>
</table>

**V.4. DISCUSSIONS**

Patients and other outside observers can cause enamel damage than normal fluorotică (114,116,117) and are generally dissatisfied with the (118), size and degree of demarcated opacities of enamel hipomineralizare correlate with aesthetic requirements regardless of tooth affected areas (119).

Subjects had a ratio of 1.2 times greater dissatisfaction than parents and 1.7 times higher than the dentist.

Thus, children and dentist were more critical in assessing the appearance of white-Crete specific opacity, and parents in assessing the appearance of yellow discontent threshold is lower than the children or parents. Girls and parents were more critical of girls compared with boys appreciation.

Older children, parents of older children and dentist evaluation in older children was more critical to them than younger children. Parents with higher socioeconomic status have higher expectations from their children's teeth look. Diffuse opacity appreciation to the dentist was more critical than normal tooth, and the matter hypoplasia was incriminated as
unaesthetic dental appearance more than the respondents without injury. Studies conducted in recent decades have shown significant differences between the perception of aesthetic dentists, students and external observers. Most studies reflect the views of children / parents that very mild and mild fluorosis is not an identifiable disease, the response was similar to normal enamel. In the study by Chikte et al., Children 15 years have expressed an interest and a greater concern for tooth color compared with children of 12 years. Our results are similar, confirming that older children are more aware of dental appearance, being more aware of its social consequences (120).

<table>
<thead>
<tr>
<th>TABLE 17. Average score and t-test value for children, parents and dentist examiner</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
</tr>
<tr>
<td>≥13</td>
</tr>
<tr>
<td>5-12</td>
</tr>
<tr>
<td><strong>Socio-economic status</strong></td>
</tr>
<tr>
<td>Medium</td>
</tr>
<tr>
<td>Low</td>
</tr>
<tr>
<td><strong>Modified DDE index</strong></td>
</tr>
<tr>
<td>Absent</td>
</tr>
<tr>
<td>Demarcated opacity</td>
</tr>
<tr>
<td>Diffuse opacity</td>
</tr>
<tr>
<td>Hypoplasia</td>
</tr>
<tr>
<td><strong>The reason for dissatisfaction vis-à-vis of dental appearance</strong></td>
</tr>
<tr>
<td>Fluorosis</td>
</tr>
<tr>
<td>Opacity</td>
</tr>
<tr>
<td>Hypoplasia</td>
</tr>
<tr>
<td>Other defects</td>
</tr>
<tr>
<td>Other reasons</td>
</tr>
<tr>
<td>Yellow colour</td>
</tr>
<tr>
<td>Esthetic restauration</td>
</tr>
</tbody>
</table>

If the differences can be seen, the degree of dissatisfaction on aesthetics is inversely proportional to the degree of lesion: the lesion is more advanced, higher negative perception (121). Children may be more critical in assessing dental appearance compared with their parents (114), or
parents may be less harsh in their assessments (122), 43% of parents were dissatisfied with their children's tooth color. Our results confirm that small are more critical in assessing patients compared with their parents. Dentists have a good observation of anomalies driven by expertise and clinical experience, especially compared to outside observers (123-125). In a group the proportion was 9.8% DDE, a third expressed dissatisfaction on the appearance of front teeth (31.6%) and 33% of those with DDE have complained on the color front teeth. It can be concluded that the perception of aesthetic front tooth is not a major problem, but should not lose sight of the fact that two thirds of the lot have low socioeconomic status, the origin of poor rural areas.

Children generally dissatisfied with dental appearance (odontal status) were 5 times less in the group with anterior teeth affected by DDE, to those unaffected by the DDE. Extremely negative social impact damage was increased in both groups and also interest in improving the aesthetic entourage was increased. Children dissatisfied with dental appearance front were 2.6 times less in the group with anterior teeth affected than those unaffected. In most cases those changes were the appearance of color and translucency of teeth in both groups. Psychological reactions caused by disorders aesthetics were concerned about large-scale color in both groups (72.7% in the DDE and 59.8% in the group without DDE) and only 4.5% and 19.7% of these cases low social integration. Sujak observed reduced psychosocial impact among children dissatisfied with the appearance of front teeth (126).

V.5. CONCLUSIONS

1. 31.6% children were treated as children generally satisfactory dental appearance and the appearance of front teeth 29.2%.
2. Children dissatisfied with dental appearance front were 2.6 times less in the group with anterior teeth affected than those unaffected.
3. 14.9% children were dissatisfied with the color of their teeth, 25.3% felt that their teeth were too yellow, 28.6% thought the appearance of white-Crete opacities due to unsatisfactory.
4. Children were most critical in assessing aesthetic - 1.2 times the parents and 1.7 times higher than dentists.
5. Opacities have been a major problem for any interested party, cited as a reason for discontent so dentist and children. Demarcated and diffuse opacities children were not more critical than children without DDS, but children with hypoplasia were more critical appreciation of both the dental
appearance of opacities and from that without DDS. 6. Parents of children with hypoplasia had significantly more critical views. 7. Negative social impact was significantly associated with sex. 8. Aesthetics front teeth is a major problem, but should not lose sight of the fact that two thirds of the lot have low socioeconomic status of origin of rural poor. 9. Adverse psychological disorders caused by concern about the color aesthetics were extensively associated with an increased response to colleagues in the DDS group, but social integration is not affected only 4.5% of children with DDS compared with 19.7% in children without DDS.
GENERAL CONCLUSIONS

• The prevalence of DDS assessed in our study is 12.57% in the group average socioeconomic status and 8.48% in the group with low socioeconomic status, using the index DDE / DDE changed and that 8.68 / 6.84% after SCOTS index. 9.8% of children experienced at least one tooth affected, of which 90 children (90.9%) had at least one previously affected tooth.

• The indices we use the DDE index used as a tool that is suitable for enamel defects optimal classification according to descriptive criteria and has a recording system suitable for opacities that are most represented in the group studied by us, and index DDE is more useful as screening tests.

• There were significant differences between children with and those without DDE, by mother's education, socio-economic status or smoking, but there were no significant differences according to maternal age at birth or the number of tasks

• Children with DDS had average birth weight and gestational age on average significantly lower than that of children without DDE

• The frequency of significant disease in children in group met with socioeconomic status environment than those without DDE was noted only at the level of persistent viral infections acute upper respiratory tract. In the group with low socioeconomic status reports gathered significant for several diseases in which the strongest were for temporary dental trauma.

• The combination of history of disease in children classified types of DDE modified DDE index in the entire group studied, the most frequently observed in relation to diffuse opacities compared with demarcated.

• The risk of development of enamel defects due to consumption of antibiotics in relation to associated diseases is performed for a large part of the general conditions of his antecedents, the maximum - 24.98 recorded in combination with neurological disorders.

• The development of enamel defects studied population of Iasi and guards appear most often diffuse opacities most commonly associated with traumatic or idiopathic factors.

• enamel hypoplasia and hypoplastic imperfect amelogeneza have a part-time and damage to surfaces and limited number of teeth.

• Administration of antibiotics in the first four years of life depending on the type DDE, opacity and hypoplasia mainly associated with amoxicillin and penicillin no significant differences, except for the second year of life.

• The combination of antibiotics with developmental defects of enamel in the first year of life revealed a relative risk of 1.66 times that after four
years of administration to reach a relative risk of over 2 times higher.
• The administration of 15-20 mg / kg / day thickness of enamel on teeth extracted from experimental animals was slightly increased, but could not achieve significant reports.
• 31.6% children were treated as children generally satisfactory dental appearance and the appearance of front teeth 29.2%.
• 14.9% children were dissatisfied with the color of their teeth, 25.3% felt that their teeth were too yellow, 28.6% thought the appearance of white-Crete opacities due to unsatisfactory.
• Children were most critical in assessing aesthetic - 1.2 times the parents and 1.7 times higher than dentists.
• Opacities were a major problem for any interested party, cited as a reason for dissatisfaction both dentist and children. Demarcated and diffuse opacities children were not more critical than children without DDE, but children with hypoplasia were more critical appreciation of both the dental appearance of opacities and from that without DDE.
• Parents of children with hypoplasia had significantly more critical views.
• Negative social impact was significantly associated with sex.
• Aesthetics front teeth is a major problem, but should not lose sight of the fact that two thirds of the lot have low socioeconomic status of origin of rural poor.
• Adverse psychological disorders caused by concern about the color aesthetics were extensively associated with an increased reaction of colleagues in the DDE group, but social integration is not affected only 4.5% of children with DDE compared with 19.7% in children without DDE.
PRACTICAL APPLICATION DIRECTIONS FOR RESEARCH

New data obtained in this study allow us to establish some way of practical application. Medicine today has a preventive character of the right to health because it was a duty to preserve health. This however requires efforts by educating local medical network which has pediatric grjiă to conserve and improve biological fund objective can be achieved only through hard work in this regard.

Our research projected means preventive and curative interception of these clinical entities in each of the stages studied age, after a judicious and thorough clinical assessment and paraclinical. The trend of increased frequency of these conditions warrants special interest in the implementation of preventive programs and strategies aimed mainly oral health of children.

The best method of treatment remains their prevention, aiming etiology incriminated factors. Maternal illness during pregnancy and child in the first year of life, can affect the structure of hard tissues of the body in training and dental mineralization. Diseases such as viruses, fever, poisoning, diseases of early childhood exanthema, etc., can result in a transient interruption of the activity forming enamel, dentin and cement. Insufficient mineralization Deficiency certain diets deficient in vitamin A intake, C, D and E, may lead to changes in balance phosphocalcic and enamel defects. Avoiding certain medications that odontogenează during tetracycline and amoxicillin strict supervision, as incorporated into the structure determines specific stains teeth and permanent teeth that hipomineralizare on development.

In the geographical environment factors, climatic, socio-economic, dietary habits and level of health education on prevention and combat involving harmful elements to the modern civilization, pollution, stress. It is necessary to improve quality of care and health education in the population.

Direct application of this study addresses the development of enamel defects diagnosis, which may be one of certainty supported by complementary exams radiologic studies, histology for the detection and selection of causal factors and establishment of odontogenează disturbed period, allowing an accurate diagnosis, a appropriate therapy and, mainly, a selective prevention.

Since interception etiologic factor (local or systemic gene) prenatally or postnatally is difficult, take the assistance and cooperation programs involving family physicians.
Prevention is an important step in the management of dental abnormalities of structure. At any age (dentație temporary dentition mixed dentație permanent), oral hygiene, hygiene, nutrition and supplementation of fluoruri aims to preserve the remaining hard structures. The seriousness of these cases requires systematic studies, extensive to form a better picture of us on dimensiunii și caracteristicilor and establish correlations with various afecțiunii boosted risk factors. The results of this study show that socio-economic indicators, such as birth, nutrition in the first year of life, low birth weight, prematurity is related to the prevalence of dental dystrophies.

Our research recommend larger studies to assess the risk of damage in different parts of the country to change the optics of thought and action issues and interception prevention of these diseases, with directions in primary prevention, since prevention of fetal life and continuing with the general and local infants and small children and communities supported preventive supervision.

The study opens new perspectives in addressing the clinical and therapeutic issues of development of enamel defects. Developed based on clinical observations and statistical analysis, the paper describes an algorithm for evaluating individual judicious development of enamel defects.

Study finds applicability in practice, both for doctor Pedodontics and for general care, oral aesthetics is important in normal psychosocial development. The thesis has a profound practical for the clinician implicații in prevention, in that it presents in a rigorous, well-argued with clinical observations, statistical interpretation.

Our study findings within the current trend of dental aesthetics. In conclusion, our study has contributed to the problem in terms of DDE pedodontics demonstrating interdisciplinary subject.


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