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"DENTAL AND PERIODONTAL HEALTH STATUS IN CHILDREN: A NEW PROPOSAL OF EPIDEMIOLOGICAL-EXPERIMENTAL PROTOCOL AND STUDY".

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INTRODUCTION

Oral diseases are both an individual and a community health problem. Oral pathology is a major public health problem because of its prevalence, burden of disease and health impact.

In 1979 the most important goal ever to be formulated for global oral health was announced by WHO. By the year 2000, the global average for dental caries was to be no more than 3 DMFT (number of decayed, missing and filled teeth) at 12 years of age. At the World Health Assembly in 1979, this declaration was unanimously consideres as being the overriding priority for WHO. In 1983 oral health was declared as part of the Strategy for Health for All (World Health Assembly 36.14) and in 1989 the Organization endorsed the promotion of oral health as an integral part of Health for All by the year 2000 (World Health Assembly 42.39). In addition, World Health Day in 1994 was dedicated to oral health which also reflects the importance attached to this issue. The caries decline observed in many developed countries was the result of a number of public health measures, coupled with changing living conditions, lifestyles and improved self-care practices.

In fact, most authors agree that the widespread use of fluoride in the toothpaste is the main reason for this decrease [Beltran-Aguilar et al., 2005; Burt, 2005]. Preventive programs and changes in the restorative dental treatment approach are reported as important factors, too [Edelstein, 2002; Riordan, 1997; Sheiham, 1997]. However, the real contribution of health services in the improvement of oral health remains unclear. A possible contribution of dental services to caries decrease is the change in diagnostic and treatment criteria [Campus et al., 2007]. Improvement in oral hygiene and natural cyclical variation may also explain the decrease. Mass media and advertisement bring new standard for every-day life and they have a strong influence on both dietary and dental care habits. Additional factors like overall nutrition, number of meals and snacks per day, use of noncariogenic sweeteners and socioeconomic status are to be considered [Llena and Forner, 2008].

A large number of research reports have shown DMFT tendency to decrease in many European countries [Marthaler et al., 2005]. The European average DMFT ranges now from 0.9 in the Netherlands and Sweden to 7.8 in Serbia.

By 1995, the mean DMFT in six industrialised Westen European countries (Demark, Filand, Ireland, the Nederlands, Sweden, UK) had fallen below 2.0 [Poulsen et al., 2002; Haugejorden et Birkeland, 2005], reaching the WHO requirement of the 1979: “caries experience in 12-years-old children less than 3.0 in the year 2000” [Chen, 2002; WHO, the World Health Reports, 2002].

However, data from Italy, where no comprehensive prevention system is present, are still alarming. Furthermore, there are only few Italian reports about children caries experience and, sometimes, with contradictory results: in North Italian areas mean DMFT ranged from 1.21 to 1.83 [Campus et al., 2005], in Milan it was 1.52 [Vezzoni et al., 2005], in Venice 2.2 [Ferro et al., 2007], in Rome 1.8 [Angelillo et al., 1998], in Sassari 0.8 [Campus et al., 2007] and 2.6 Crotone [Migale et al., 2009].

In some countries this positive trend could deter action to further improve oral health, or sustain achievements. It might also lead to the belief that caries problems no longer exist at least for the developed countries, resulting in precious resources available for caries prevention being diverted to other areas. However, it must be stressed that dental caries, as a disease, is not eradicated but only controlled to a certain degree. The burden of oral disease and needs of populations are in transition and oral health systems and scientific knowledge are changing rapidly. In order to meet these challenges effectively public health care administrators and decision-makers need the tools, capacity and information to assess and monitor health needs, choose intervention strategies, design policy options appropriate to their own circumstances, and to improve the performance of the oral health system.

WHO Oral Health Programmes at Headquarters and Regional levels recently assessed the accomplishment of theWHO/FDI goals for oral health by the year 2000, and the formulation of new WHO goals has been initiated (DMFT< 1.0 at 12 years).

The WHO Regional Office for Europe specified oral health targets (target 8.5) for the year 2020 as part of the Health policy. WHO, FDI and IADR are jointly preparing new goals up to the year 2020. The objectives and targets have been broadened in order to cover significant indicators related to oral health and care of population groups. The global goals are not intended to be prescriptive but the framework is primarily designed to encourage health policy makers at regional, national and local levels to set standards for oral health in relation to pain, functional disorders, infectious diseases, oro-pharyngeal cancer, oral manifestations of HIV-infection, trauma, cranio-facial anomalies, dental caries, developmental anomalies of teeth, periodontal disease, oral mucosal diseases, salivary gland disorders, tooth loss, health care services and health information systems.

The WHO Oral Health Programme will support countries directly as well as through regional and country offices in their formulation of goals, targets and standards of oral health. For those countries, who still have not reached the WHO/FDI global goal 3 DMFT, this goal is the first priority. As a following step, it has been proposed that the SiC Index (Significant Caries Index) for countries should be less than 3 DMFT in the 12-year-olds by the year 2015. Focusing attention to children with highest scores of DMFT with the SiC Index, will lead to significant gains for society and for person concerned as more specific targeted preventive actions can be implemented. Obviously, children with high caries prevalence will most likely to be those adults needing complex and expensive treatments in the future. Thus, the general concept is that a country should reach the WHO goal of 3 or less DMFT for the whole population first. The next step is that SiC Index of 3 DMFT should be acheived for the one third of the highest caries scores of the population. When the SiC Index is reached for the whole country, one should target provinces, districts, cities and even schools where caries levels are still high - SiC Index is above 3 DMFT. This way, the concept of "Health for All" is strengthened.

Epidemiological studies can be used as an incentive to increase community consciousness about oral health and to promote community participation in preventive actions, and to make the reorientation of oral health services towards prevention and oral health promotion easier.

ORAL HEALTH AND SYSTEMIC DISEASE

There is evidence of association between systemic diseases and oral conditions, although it is not clear if these are direct or mediated by underlying factors such as health behaviours.

Over the last decade, the possible role of oral health as a risk factor for systemic disease has been highlighted in multiple instances. Therefore, dentistry has an important role in promoting the overall health. While physicians are missing opportunities to provide primary prevention, the promotion of oral health has been suggested as a way to promote systemic health, since there is a possible role of oral infections as a risk factor for systemic disease. Caries remains the most prevalent non-transmissible infectious disease in Europe and in the rest of the world. Research on the relationship between caries and systemic diseases has provided evidence that caries may be associated with cardiovascular diseases [Holm-Pedesen et al., 2005], esophageal cancer [Dye et al., 2007], epilepsy and asthma [Stensson et al., 2008]. A better understanding of the possible relationships between caries experience and systemic diseases may provide new insight on the influences of oral health on systemic health.

Oral health and organ transplantation

Dental decay, dental infections, or prematurely missing teeth, often associated with inadequate nutrition, may further jeopardize general health already compromised. In particular, children undergoing renal or liver transplantation need to avoid infection that can compromise the survival of organ transplant recipient [Holt and Winston, 2005; Wilson et al., 1982]. Additionally, organ transplant recipients are maintained in a state of immunosuppression to prevent graft rejection, and these drug regimens may have adverse effects on oral cavity [Allman et al., 1994; Funakoshi et al., 1992; Seow et al., 1991]. Opportunistic pathogens may cause oral mucosal lesions [Meyer et al., 2000], and gingival enlargement may result from drug regimens that include cyclosporine and calcium channel blockers [Vescovi et al., 2005]. The main indications for the liver transplant are biliary atresia, inborn metabolic disorders, liver cirrhosis, liver neoplasms, Alagille syndrome, and fulminant hepatic failure.

Sfortunately, in literature, despite the major importance, little is known about the oral health status of children undergoing liver transplantation in order to promote the particular and specific dental caries prevention programs for these patients.

Several researches show an increased presence of enamel defects in children with liver transplant [Morimoto et al., 1998; Morisaki et al., 1990].

In fact, literature shows that the risk of dental enamel defects is higher in children with poor health (due to illness like severe malnutrition, hyperbilirubinemia, thyroid and parathyroid disturbances, neonatal hypocalcemia, maternal diabetes, asthma, genetic disorders such as amelogenesis imperfecta, tuberous sclerosis and cystic fibrosis) during the first three years of life (the critical period for crown formation of first permanent molars, permanent incisors and canines) [Mathu-Muju and Wright, 2006].

For this reason, enamel defects may occur with higher prevalence in children undergoing liver transplantation. Developmental defects in the enamel structure present important clinical significance since they are responsible for aesthetic problems, dental sensitivity, dentofacial anomalies, as well as for a predisposition to dental caries [Shiboski et al., 2009].

Oral health and Cystic fibrosis

However, a large number of dental enamel defects is not always associated with a high risk of tooth decay, as is the case of children affected by cystic fibrosis occurs. Several studies show that, despite the increase prevalence of dental enamel defects, the cariogenic diet and a higher tendency to form dental calculus, children affected by cystic fibrosis have a lower caries experience than healthy controls [Aps and Martens, 2004; Martens et al., 2001; Aps et al., 2001]. Cystic fibrosis (CF) is one of the most common life-shortening hereditary disease in Italy (1 in 3700 children). It is caused by mutations in a gene called "the cystic fibrosis trans-membrane conductance regulator (CFTR)". The product of this gene is a chloride ion channel important in creating sweat, digestive juices, and mucus. [Damas et al., 2008]. In essence, the deletion causes increased mucoid secretions in every exocrine gland, including the salivary glands (the sublingual glands in particular). Difficulties in breathing and insufficient enzyme production in the pancreas are the most common symptoms. Thick mucus production, as well as a less competent immune system, results in frequent lung infections, which are treated, though not always cured, by oral and intravenous antibiotics and other medications. CF Patients need many between-meal snack and sugar-rich drinks to provide themselves the necessary body energy. This diet at high cariogenic potential and the daily use of antibiotics, as well as the disease itself, may impose upon the oral environment of CF patients certain changes which could affect their dental health [Jagels et al., 1975].

In current literature, the relationship between CF and oral health is quite discordant; in fact, while some studies show that the CF patients have a lower caries experience than healthy controls and an higher tendency to form dental calculus [Primosch, 1980; Kinirons, 1989], on the other side, recent searches deny this relationship [Aps and Martens, 2004; Martens et al., 2001; Aps et al., 2001]. The low caries experience, the periodontal disease and the high prevalence of the enamel defects in CF patients could be due to the metabolic illness, and above all to the long pharmacological therapies (antibiotics and pancreatic enzymes) to which they are subjected. Some authors argue that, as cystic fibrosis patients, subjects affected by chronic respiratory disorders (like asthma) have an high percentage of dental enamel defects, high prevalence of gingivitis and high risk of tooth decay compared to healthy subjects [Narang et al., 2003].

Oral health and Asthma

The relation between asthma and oral disease is controversial. Asthma is a chronic airway disease characterized by inflammation and broncho-constriction. It is a serious global health problem, affecting more than 100 million people worldwide. In spite of the increasing prevalence of asthma, only a limited number of studies has investigated the asthmatic children oral health status during the last 20 years, and, however, the results are somewhat conflicting.

Some authors have reported a correlation between childhood asthma and dental caries in children, [Arnrup et al., 1993; Stensson et al., 2008; Ersin et al., 2006; McDerra et al., 1998; Milano et al., 2006; Reddy et al., 2003] suggesting that asthmatic children are at higher risk for oral diseases than non-asthmatic children due to either their disease and/or their pharmacotherapy; whereas other authors have not found such a connection [Meldrum et al., 2001; Shulman et al., 2001; Bjerkeborn et al., 1987].

Although there are studies in the literature considering the relationship between dental caries risk and asthma, a few studies investigated the effects of the severity of this disease and of the type of medication on oral health.

Guidelines for diagnosis and management of asthma developed by the National Institutes of Health (NIH) include a system of classification of asthma severity; this system uses three variables (frequency of daytime symptoms, frequency of night-time symptoms and lung function) to define four categories of asthma: a form of mild intermittent asthma, and three forms of persistent asthma (mild, moderate and severe). Fortunately, most of asthmatic children has mild intermittent and mild persistent asthma [Tessari et al., 2008]. In order to facilitate comparison between studies about the correlation between asthma and oral disease, it is desirable that everyone uses this classification.

AIM

Recent epidemiological studies indicate a reduction in the occurrence of caries in Italy, which is in line with the trend observed in industrialized countries in the last decades. Despite this reduction, a polarized distribution of the disease has been observed.

In order to create prevention programs specific to each area, it is necessary that have specific data of territory.

The aim of this study was to determine the oral health situation of the Campanian children, Italy. The final aim is to establish an oral health baseline prior to introducing promotion and prevention strategies and appropriate health care for specific groups, and to provide the starting point for monitoring the time evolution according to the World Health Organization 2020 global goals for oral health in Campania region, Italy.

This study analysed in the first instance dental and periodontal health status of Campanian schoolchildren (Group I). In order to facilitate the identification of subgroups with increate risk of oral disease, this study investigated the group of population which required oral care like children who every day belong to Paediatric Dentistry Department of "Federico II" University of Naples (Group II).

Simultaneously, this study investigated groups of children who, because of serious systemic diseases, may present increased risk of tooth decay and periodontal diseases.

In fact, literature shows that the risk of dental enamel defects is higher in children with poor health (due to illness like severe malnutrition, hyperbilirubinemia, thyroid and parathyroid disturbances, neonatal hypocalcemia, liver neoplasms, maternal diabetes, asthma, genetic disorders such as amelogenesis imperfecta, tuberous sclerosis and cystic fibrosis) during the first three years of life because this is the critical period for crown formation of teeth. [Mathu-Muju and Wright, 2006].

This study analyzed children undergoing liver transplantation (Group III), children with respiratory problems such as children with asthma (Group IV) and children affected by cystic fibrosis (Group V).

MATERIALS AND METHODS

This cross-sectional observational study was carried out from March 2008 to June 2010.

The ethical principles expressed in the World Medical Association Declaration of Helsinki were followed in this study and all parents of the children, after receiving verbal and written explanations of the experimental protocol and the study aims, gave written informed consent. Furthermore, the approval for this study has been asked and gotten by the ethical committee of the Naples University "Federico II" (number 73/09).

Participants

Group I

The sample included 828 children (472 females and 356 males) randomly selected from 10 public schools of the Regional Campanian district (zones: Salerno, Caserta, Napoli, Benevento and Avellino).

Inclusion criteria required that children were 6 or 12 years old, were from single live births, in good health (ASA I-II) with or with no history of therapeutic dental care.

The participants at the study were divided in two subgroups in relation to the age: Group A and Group B for 6 and 12 years old, respectively.

Group II

The study group included 366 children (171 females and 195 males) recruited randomly from volunteer patients at Paediatric Dentistry Department of “Federico II” University of Naples (Italy).

Inclusion criteria required that children were 6 or 12 years old, were from single live births, in good health (ASA I-II) with or with no history of therapeutic dental care.

The participants at study were divided in two subgroups in relation to the age: Group C and Group D for 6 and 12 years old, respectively.

Group III

38 children (22 males and 16 females) undergoing liver transplantation (age range 4-6 years) were selected from volunteer patients in the “Federico II” hospital, Department of Hepatology, Naples .

Inclusion criteria for the liver transplantation group required that children had undergone liver transplantation, with or with no history of therapeutic dental care. The types of paediatric liver disorders were classified.

The results about oral health status of children undergoing liver transplantation were compared to those obtained from 78 mached age healthy children and randomly selected from public school of the Regional Campanian district. In fact, it wasn’t possible to compare the group III with Group I without having a bias for the age.

Exclusion criteria for both groups were fluoride assumption during grow and presence of dental fixed orthodontic appliances.

Group IV

124 children affected by asthma (age range 7-12 years) were selected from volunteer patients in the "A. Cardarelli" Hospital, Department of Pneumology – Naples.

All subjects were visited by three paediatricians according to ASA classification (American Society of Anesthesiologists classification) and to guidelines for the diagnosis and management of asthma developed by the National Institutes of Health (NIH) and by the National Asthma Education and Prevention Program.

The results about oral health status of asthmatic children were compared to those obtained from 156 mached age healthy children and randomly selected from public school of the Regional Campanian district. In fact, it wasn't possible to compare the group IV with Group I without having a bias for the age.

Inclusion criteria for the asthmatic group required that children were affected by asthma with mild intermittent form and mild persistent form, with or with no history of therapeutic dental care. Inclusion criteria for the control group required that children were from single live births, in good health (ASA I) with or with no history of therapeutic dental care.

Exclusion criteria for both groups were fluoride assumption during grow and presence of dental fixed orthodontic appliances.

Group V

54 children affected by cystic fibrosis (age range 7-12 years) were recruited from volunteer patients at the CF Center of the University of Naples "Federico II"- Italy.

All subjects were visited in the Paediatric Dentistry Department of "Federico II" University of Naples (Italy).

The results about oral health status of cystic fibrosis children were compared to those obtained from 101 mached age healthy children and randomly selected from public school of the Regional Campanian district. In fact, it wasn't possible to compare the group V with Group I without having a bias for the age.

Inclusion criteria for CF group required that children had cystic fibrosis and didn't assume fluoride.

Parents or guardians were approached by a trained interviewer who explained the aim of the study, its procedure and benefits.

Questionnaire data

A questionnaire investigating demographic and oral health behaviour data was completed by their parents. The first part of the questionnaire included questions on demographic and social factors such as children's age, gerder, date and place of birth, family income, ect.

Oral health questions were administered to obtain data on children's oral hygiene habits like onset of toothbrushing habits, frequency of toothbrushing at the moment of the interview and frequency of use of extra cleaning devices such as dental floss or use of fluoridate toothpaste. These questions were used as indicators of quality, duration and frequency of oral hygiene behaviours.

Clinical examination

Clinical examinations were carried out by three experts and calibrated professionals, using a plane buccal mirror, the WHO CPITN ballpoint and dry field (relative isolation with cotton rolls, blotter triangulated and bulb syringe). The presence of dental decay was assessed by systematic evaluation of each child's caries experience using the DMFT/dmft index [sum of decayed, missing and filled teeth for permanent dentition (DMFT) and for deciduous dentition (dmft)].

CPITN index (Community Periodontal Index of Treatment Needs) was recorded using a WHO CPITN ballpoint, on 1.1, 1.6, 2.6, 3.1, 3.6 and 4.6 surfaces, when possible, following the WHO indications [Ainamo et al., 1982].

Enamel defects were assessed using the modified Developmental Defects of Enamel (DDE) Index in which the type (opacitity, hypoplasia, discoloration), number (single and multiple), demarcation (demarcated and diffuse) and location of defects on the buccal and lingual surface of teeth were recorded (table 1) [Clarkson and O'Mullane, 1989].

After the examination, a report was sent to parents and children with therapeutic needs were referred to an oral health professional in a health centre.

MODIFIED DDE INDEX
0 - Normal
1 - Demarcated opacities white/cream
2 – Demarcated opacities yellow/brown
3 – Diffuse lines opacities
4 – Diffuse patchy opacities
5 – Diffuse confluent opacities
6 – Diffuse confluent/patchy opacities with hypoplasia missing enamel
7 – Hypoplasia pits
8 – Hypoplasia missing enamel
9 – Any other defects

Tab. 1- Classification of dental enamel defects.

Inter-examiner calibration

Before beginning the study, the examiners were calibrated for each index recorded. The kappa statistic was used to compare each of the three examiners to one examiner used as gold standard with respect to the DMFT index measured on 40 for each examiner, to the CPITN index measured on 30 molars and 30 incisor for each examiner and DDE index measured on 40 teeth. Then, each examiner was compared against the other two.

Statistical analysis

All statistical procedures were performed using the Statistical Package for the Social Sciences (SPSS 10.0 for Windows). For all statistical tests, a confidence interval of 95% and significance level of 5% ($p < 0.05$) were adopted. From the obtained data, DMFT/dmft scores were calculated; mean values, standard deviation, and frequency distribution were computed.

The Significant Caries Index, which is the mean DMFT of the one-third of the population with the highest DMFT values, was determined through an online developed Microsoft Excel® application (http://www.whocollab.od.mah.se/expl/siccalculation.xls). Prevalence of caries-free children, CPI and DDE index were also measured. The comparison of mean DMFT, among groups was carried out using one-way analysis of variance (ANOVA). The comparison of CPITN and DDE scores between the two groups was carried out using logistic regression analysis.

RESULTS

Inter-examiner calibration

The kappa statistic comparing DMFT measured by each examiner to DMFT measured by an examiner used as a gold standard , yielded scores of 0.87, 0.78, and 0.90, respectively. For CPITN the kappa score was 0.95, 0.89 and 0.90 when comparing gold standard examiner and examiners 1, 2 and 3, respectively while for DDE index the kappa value was 0.87, 0.78 and 0.83.

For DMFT/dmft index, the kappa was 0.85 when comparing examiners 1 and 2, 0.79 when comparing examiners 2 and 3, and 0.82 when comparing examiners 1 and 3. For the CPITN, there was perfect concordance between examiners with a kappa of 1. The kappa score for DDE index was 076 when comparing examiners 1 and 2, 0.73 when comparing examiners 2 and 3, and 0.81 when comparing examiners 1 and 3.

Group I

Clinical examination

The analyzed sample consisted of 828 healthy subjects (472 females and 356 males). Group A (6 years old) and group B (12 years old) consisted of 387 (219 females and 168 males) and 441 (253 females and 188 males), respectively.

In group A (6 year olds) 94.6% of children was caries free for permanent dentition while only 56.6% was caries free for deciduous dentition.

The DMFT mean value was 0.09±0.42 with maximum and minimum values of 3 and 0, respectively. The dmft mean value was 1.44±2.13 with maximum and minimum values of 9 and 0, respectively. Table 2 shows the DMFT/dmft index and the distribution of its components [decayed teeth (0.09±0.42. and 1.09±1.67), missing teeth (0.0 and 0.26±0.99) and filled teeth (0.0 and 0.16±0.53) for permanent and deciduous dentition, respectively]. The DFS mean value was 0.9±0.42 with maximum value of 5 while the dfs mean value was 2.16±3.26 with value of maximum of 14.

	Minimum	Maximum	Mean	Std. Deviation
DMFT	0	3	,09	,42
DECAYED	0	3	,09	,42
MISSING	0	0	,00	,00
FILLED	0	0	,00	,00
dmft	0	9	1,44	2,13
decayed	0	7	1,11	1,67
missing	0	8	,26	,99
filled	0	3	,16	,53

Tab. 2: DMFT/dmft index and the distribution of its components for 6 year old children.

In group B (12 year olds) caries prevalence was 35.8%. The DMFT mean value was 1.17±1.96 with maximum and minimum values of 10 and 0, respectively. Table 3 shows the DMFT index and the distribution of its components [decayed teeth (0.64±1.37), missing teeth (0.07±0.46) and filled teeth (0.35±1.12). The DFS mean value was 1.61±3.49 with maximum and minimum values of 24 and 0, respectively.

	Minimum	Maximum	Mean	Std. Deviation
DMFT	0	10	1,17	1,96
DECAYED	0	8	,64	1,37
MISSING	0	6	,07	,46
FILLED	0	7	,35	1,12

Tab. 3: DMFT index and the distribution of its components for 12 year old children.

SIC, which is the mean DMFT of the one-third of the population with the highest DMFT values, was 0.28±0.70 and 3.42±1.97 for group A and group B, respectively. CPITN data elaboration showed that 48.8% of group A and 44.2% of group B had a healthy periodontal status. 38.8% of the 6 year old children and 36.1% of the 12 year old children had plaque and calculus. 12.4% of group A and 19.7% of group B showed bleeding on probing (fig 1).

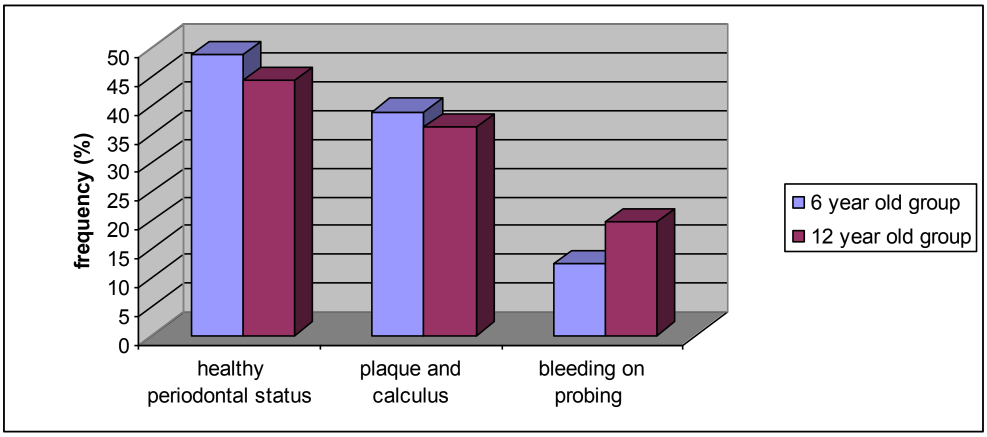

Fig. 1: CPITN values in 6 and 12 year old children.

12.4% of the 6 year old children (48 of 387subjects) and 16.3% of the 12 year old children (72 of 441 subjects) had enamel dental defects. In particular, in group A, 4.7% had marketed opacity white/cream, 1.6% showed marketed opacities yellow/brown, 3.9% had irregular diffuse opacity, 0.8% presented diffuse confluent opacities and 0.8% showed hypoplasia with loss of enamel (fig.2). In group B, 8.8% had marketed opacity white/cream, 2.7% presented marketed opacities yellow/brown, 3.4% had irregular diffuse opacity and 1.4% hypoplasia with loss of enamel (fig.2).

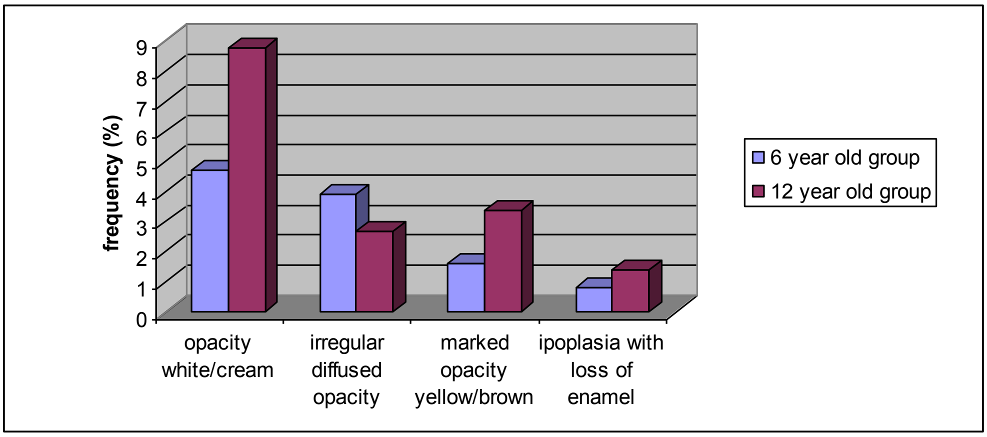

Fig. 2: Distribution of enamel dental defects.

Questionnaire data

67.4% of group A and 84.4% of group B received a dental examination before this study. In both groups, DMFT/dmft mean of the children with a history of recent dental visit (1.20±2.02 and 1.54±2.23) was higher than children who had never been to the dentists (1.05±1.65 and 1.18±1.95).

Difference, also, in gingival health was observed across dental visit habits; in fact, children with a history of recent dental visit had worse gingival health than children, who had never been to the dentists ($p<0.01$).

In two groups it is evident that the increase in consumption of sugary expanded the risk of tooth decay, In fact, sugary intake influenced proportionally the values of DMFT/dmft (fig.3 and 4).

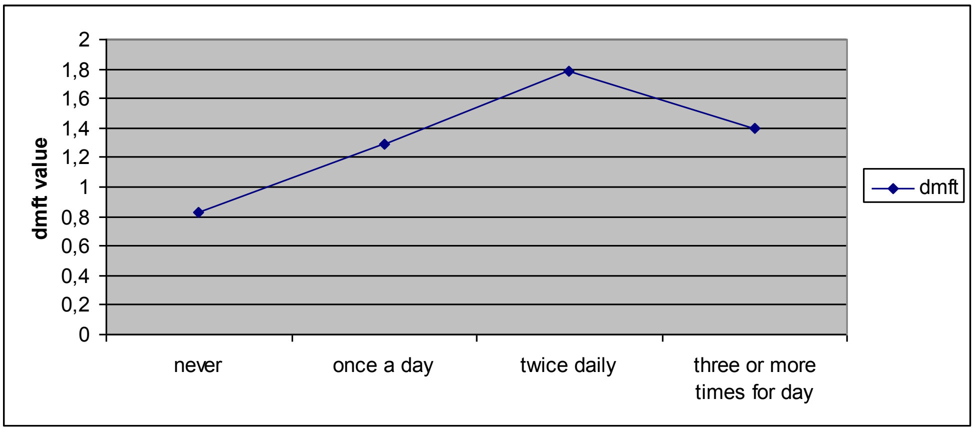

Fig. 3: dmft value at 6 years old in relation to increase of intake sugary.

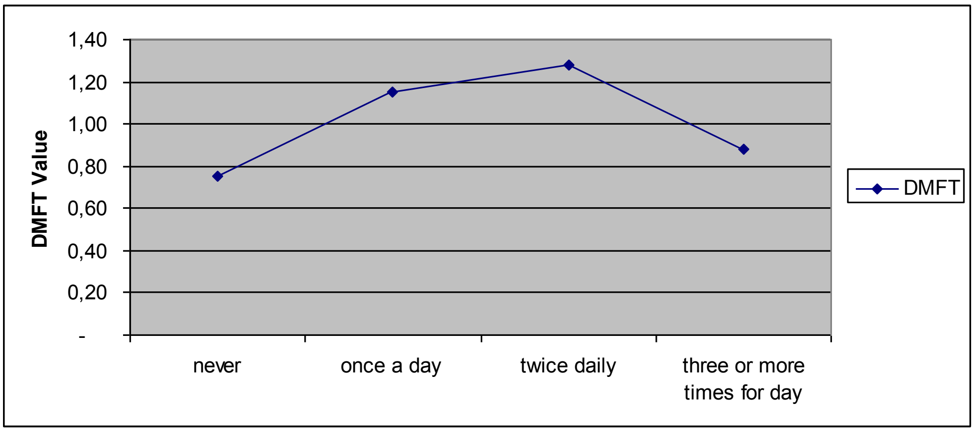

Fig. 4: DMFT value at 12 years old in relation to increase of intake sugary.

In group A only 57.4% of children washed their teeth after eating. DMFT values were statistically different in relation to this habit ($p<0.05$) (tab. 4).

		Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
				Lower Bound	Upper Bound		
DMFT	wash teeth	,04	,26	,01	,07		
	no wash teeth	,14	,53	,05	,22	5,568	,019
	Total	,08	,39	,04	,12		
dmft	wash teeth	1,38	2,20	1,09	1,67		
	no wash teeth	1,51	2,10	1,17	1,84	,336	,562
	Total	1,43	2,15	1,21	1,65		

Tab. 4: DMFT/dmft values in relation to wash teeth habit after eating.

In group B, 60.5% of subjects washed their teeth after eating. DMFT were higher in subjects which didn't wash their teeth after eating, but the difference was not statistically significant (1.19 ± 1.97 vs 1.06 ± 1.62).

In group A, 88.4% lived with both parents; the family solidity influenced significantly caries experience (tab.5).

		Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
				Lower Bound	Upper Bound		
DMFT	with both parents	,07	,37	,03	,11		
	only with mother	,29	,72	-,04	,61	3,281	,039
	only with father	,00	,00	,00	,00		
	Total	,08	,39	,04	,12		
dmft	with both parents	1,35	2,11	1,13	1,57		
	only with mother	2,43	2,50	1,29	3,57	2,936	,054
	only with father	2,00	2,56	,37	3,63		
	Total	1,43	2,15	1,21	1,65		

Tab. 5: DMFT/dmft values in relation to live with parents.

In group B, 92.3% of subjects lived with both parents; caries experience was higher in subjects which didn't live with both parents, but the difference of DMFT values was not statistically significant (1.14±1.93 vs 1.06±1.62).

In 6 year old children, the intake of soft drink influenced caries experience; in fact, higher consumption of soft drink was associated to increasing values of DMFT/dmft (tab.6).

				95% Confidence Interval for Mean			
		Mean	Std. Deviation	Lower Bound	Upper Bound	F	Sig.
DMFT	never	,10	,54	,02	,21		
	one	,05	,29	,01	,09		
	two	,19	,50	,06	,32	2,711	,045
	three or more	,00	,00	,00	,00		
	Total	,08	,39	,04	,12		
dmft	never	,90	1,95	,49	1,31		
	one	1,30	1,70	1,05	1,55		
	two	2,71	2,94	1,97	3,45	10,360	,000
	three or more	1,21	2,27	,51	1,92		
	Total	1,43	2,15	1,21	1,65		

Tab. 6: DMFT/dmft values in relation to soft drink intake in group A.

In 12 year old subjects the intake of soft drink influenced caries experience, but the difference was not statistically significant (tab.7).

				95% Confidence Interval for Mean	
		Mean	Std. Deviation	Lower Bound	Upper Bound
DMFT	never	1,30	2,09	,85	1,74
	one	,97	1,80	,74	1,21
	two	1,44	2,25	,95	1,93
	theee or more	1,58	1,92	,89	2,26
		1,17	1,97	,99	1,36

Tab. 7: DMFT/dmft values in relation to soft drink intake in group B.

It is important that children were instructed on how to carry out effective oral hygiene. In fact, 82.3% of 6 year old children and 92.3% of 12 year old subjects, who learned how to properly clean their teeth, had a DMFT value lower (0.06±0.35 and 1.33±2.14) than those that were not instructed on correct toothbrushing (0.40±0.83 and 1.60±1.92). In both groups, gingival health was influenced by instruction on correct toothbrushing; in fact, children who learned how to properly clean their teeth, had a gingival health scores lower than those that were not instructed on correct toothbrushing ($p<0.001$).

20.2% of group A and 39.5% of group B used daily mouth-rinse. In group A, the dmft value was higher in children which used mouth-rinse (2.85±2.57) respect to those which used only toothbrushing (1.07±1.87) while, in two groups, DMFT value was similar in both cases (0.08±0.27 and 0.08±0.42 in group A) (1.16±1.94 and 1.19±1.99 in group B). In both groups, no difference in gingival health was observed across use daily mouth-rinse.

Finally, in both groups, there was no statistical difference for caries experience in relation to fluoride assumption during grow.

It is interesting to note that caries experience was influenced by parents' educational level attainment (no school educational, middle, secondary, University degree) : caries prevalence values decreased with higher parents' level of education, but it was statistically significant only for mothers ($p<0.001$) (tab.8).

		Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
				Lower Bound	Upper Bound		
DMFT	no or low education degree	,50	,90	,07	1,07		
	middle school education	,04	,28	,03	,09		
	secondary school education	,13	,49	,04	,21	5,093	,001
	University degree	,00	,00	,00	,00		
	master post university	,00	,00	,00	,00		
	Total	,08	,40	,04	,12		
dmft	no or low education degree	1,00	1,28	,19	1,81		
	middle school education	1,44	2,32	1,06	1,82		
	secondary school education	1,08	1,77	,79	1,38	7,775	,000
	University degree	3,40	2,66	2,41	4,39		
	master post university	1,36	1,90	,69	2,04		
	Total	1,44	2,17	1,22	1,66		

Tab. 8: DMFT/dmft values in relation to mothers' educational level.

Finally, in group I, 8% belonged to high income level, 11.3% belonged to medium-high income level, 33.0% to medium level, 31.7% belonged to a medium-low level, 23.1% were subjects of low level.

The family socio-economic level influenced the DMFT/dmft value; in fact, low income levels were associated with higher values of DMFT/dmft index (p<0.001) (tab.9).

		Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
				Lower Bound	Upper Bound		
DMFT	low	2,36	2,22	,34	3,05		
	medium-low	1,66	2,51	,26	3,59		
	medium	1,08	1,98	,62	1,55	5,093	,001
	medium-high	,43	,98	,19	,66		
	high	,17	,59	,05	,30		
	Total	1,07	1,34	,47	1,86		
dmft	low	1,00	1,99	,46	1,54		
	medium-low	1,93	2,41	1,42	2,44		
	medium	1,21	2,07	,77	1,65	2,625	,035
	medium-high	1,20	2,01	,09	2,31		
	high	,00	,00	,00	,00		
	Total	1,39	2,18	1,11	1,66		

Tab. 9: DMFT/dmft values in relation to socio-economic level.

The family socio-economic level influenced significantly gingival health; in particular, higher values of CPITN index were associated with low income levels ($p<0.001$) and with low mothers educational level ($p<0.05$).

Group II

Clinical examination

The analyzed sample consisted of 366 (171 females and 195 males) children recruited randomly from volunteer patients at Paediatric Dentistry Department of "Federico II" University of Naples. Group C (6 years old) and group D (12 years old) consisted of 194 (92 females and 102 males) and 172 (79 females and 93 males), respectively.

In group C (6 years old) caries prevalence was 81.6%.

DMFT mean value was 1.20±1.73 with maximum and minimum values of 4 and 0, respectively. Dmft mean value was 3.19±3.15 with maximum and minimum values of 16 and 0, respectively. Table 10 shows DMFT/dmft index and the distribution of its components [decayed teeth (1.10±1.98 and 3.40±3.99), missing teeth (0.12±0.58 and 0.66±1.55) and filled teeth (0.08±0.47 and 0) for permanent and deciduous dentition, respectively].

	Minimum	Maximum	Mean	Std. Deviation
DMFT	0	19	1,30	2,37
DECAYED	0	17	1,10	1,98
MISSING	0	6	,12	,58
FILLED	0	6	,08	,47
dmft	0	20	3,40	3,99
decayed	0	17	2,77	3,42
missing	0	10	,66	1,55
filled	0	0	,00	,00

Tab. 10: DMFT/dmft index and the distribution of its components for 6 year old patients.

In group D (12 years old) caries prevalence was 65.8%. DMFT mean value was 3.43±3.67 with maximum and minimum values of 19 and 0, respectively. Table 11 shows DMFT index and the distribution of its components [decayed teeth (2.61±2.76), missing teeth (0.46±1.14) and filled teeth (0.36±0.99). DFS mean value was 1.61±3.49 with maximum and minimum values of 24 and 0, respectively.

	Minimum	Maximum	Mean	Std. Deviation
DMFT	0	19	3,43	3,67
DECAYED	0	15	2,61	2,76
MISSING	0	6	,46	1,14
FILLED	0	6	,36	,99

Tab. 11: DMFT index and the distribution of its components for 12 year old patients.

SIC, which is the mean DMFT of the one-third of the population with the highest DMFT values, was 3.54±1.26 and 6.48±3.74 for group C and group D, respectively.

CPITN data elaboration showed that the 31.9% of group C and 30.2% of group D had a healthy periodontal status. 45.4% of 6 year old children and 36.1% of the 12 year old children had plaque and calculus. 18.5% of group C and 24.4% of group D showed bleeding on probing (fig. 5).

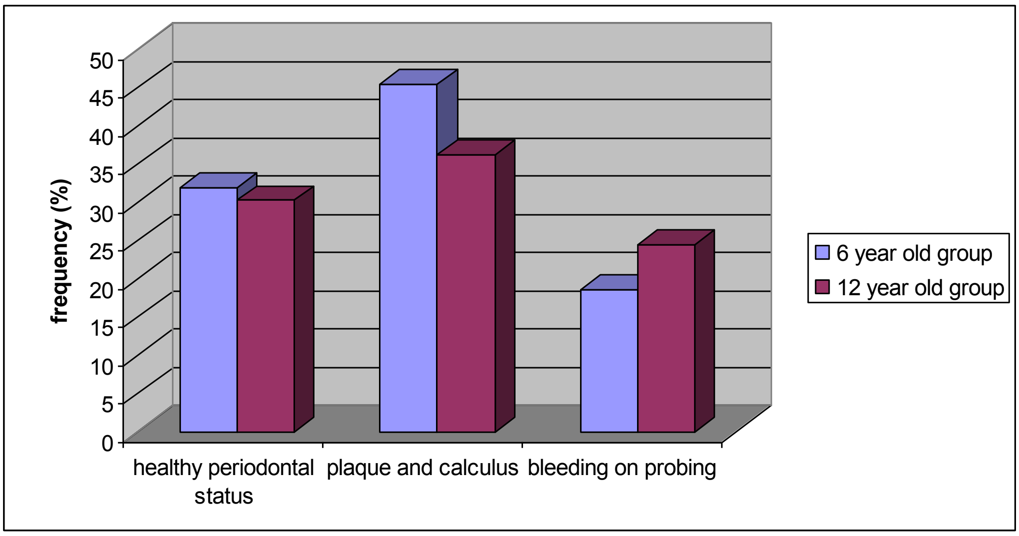

Fig. 5: CPITN values in 6 and 12 year old patients.

14.4% of 6 year old children (28 of 194 subjects) and 19.7% of 12 year old children (34 of 172 subjects) had dental enamel defects. In particular, in group C, 5.6% had marketed opacity white/cream, 4.4% showed marketed opacities yellow/brown, 3.6% had irregular diffuse opacity and 1.03% showed hypoplasia with loss of enamel (fig.2). In group D, 7.38% had marketed opacity white/cream, 6.12% presented marketed opacities yellow/brown, 4.6 % had irregular diffuse opacity and 1.6% hypoplasia with loss of enamel (fig. 6).

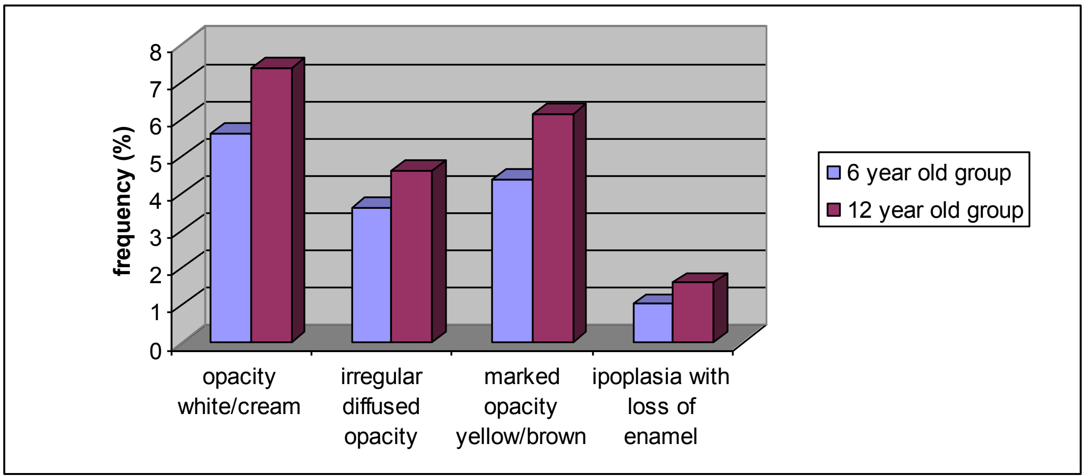

Fig. 6: Distribution of enamel dental defects.

Questionnaire data

69.5% of group C and 75.86% of group D did not receive a dental examination before this study. In both groups, DMFT/dmft mean of children with a history of recent dental visit (2.85±2.90 and 3.67±2.88) was higher compared to children, who had never been to the dentists (2.10±1.67 and 2.89±1.85).

In both groups, the same difference in gingival health was observed across dental visit habits; in fact, children with a history of recent dental visit had worse gingival health than children, who had never been to the dentists ($p<0.001$).

In 6 and 12 year old subjects, it is evident that the increase in consumption of sugars expanded the risk of tooth decay. In fact, sugary intake influenced proportionally the values of DMFT/dmft (fig.7 and 8).

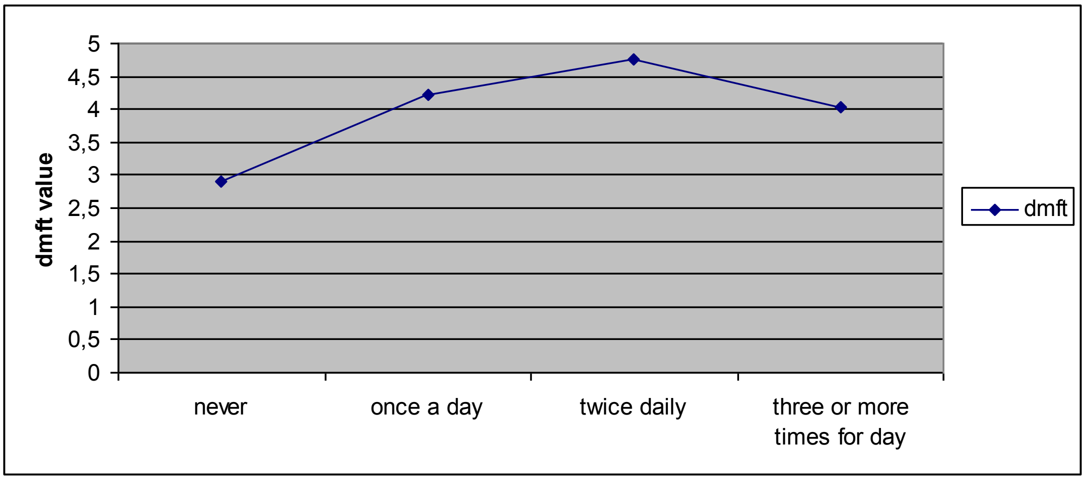

Fig. 7: dmft value at 6 year old in relation to increase of sugary intake.

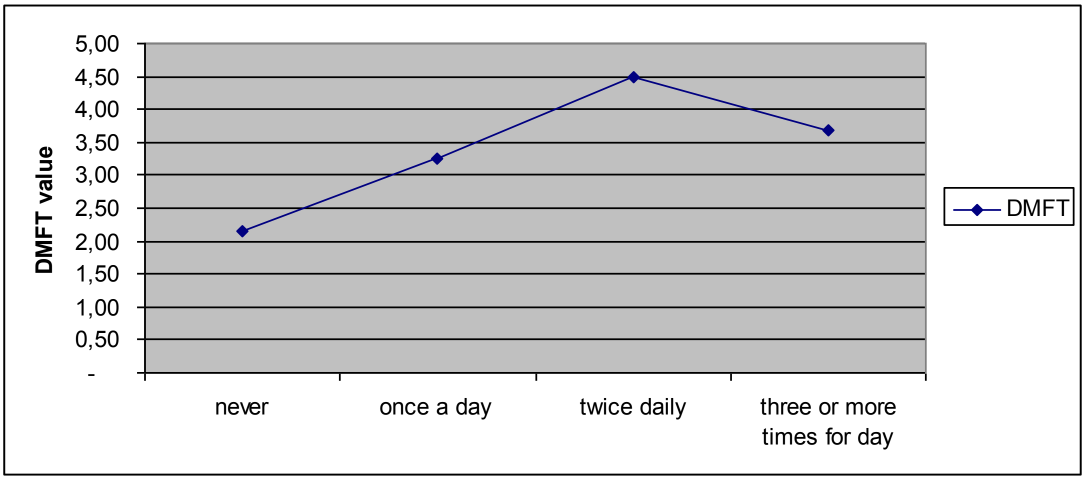

Fig. 8: DMFT value at 12 year old in relation to increase of sugary intake.

In group II, the family socio-economic level was distributed as follows: less than 2% belonged to medium-high income level, 45.4% to medium level, 21.5% belonged to a medium-low level, 31.1% were patients of low level (fig.9).

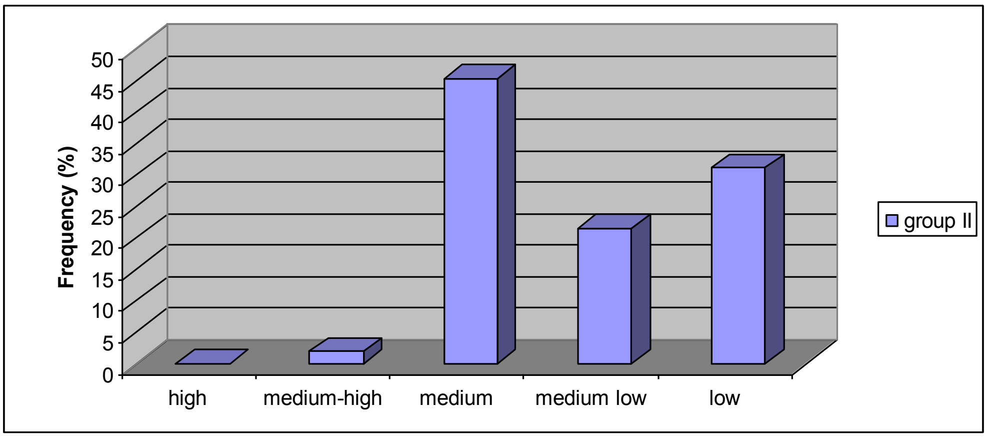

Fig. 9: Distribution of family income.

In group II, mean DMFT ranged from less than 2 (about 0.50 for dmft) in subjects with a medium-high income level to more than 6 (4.3 for dmft) in subjects with medium-low income level.

Caries experience was influenced by parents' educational level attainment (no school educational, middle, secondary, University degree): caries prevalence values decreased with higher parents' level of education, but it was statistically significant only for mothers ($p<0.001$) (tab.12). 53.8% of mothers had a middle school education, 19.9% had a secondary school educational level, less than 5% a University degree while 21.6% had no or a low educational degree. Mean DMFT was 0.67±0.98 for children with mother's high educational level and 4.68±3.69 for children with mother's no or lower educational degree (for dmft 1.92±2.68 vs 3.59±3.67) (tab.12).

The family socio-economic level influenced significantly gingival health; in particular, higher values of CPITN index were associated with low income levels ($p<0.001$) and with low mothers educational level ($p<0.05$).

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
					Lower Bound	Upper Bound		
DMFT	University degree	12	,67	,98	,04	1,29	7,006	,000
	secondary school educational	101	2,86	3,17	2,23	3,49		
	middle school educational	56	3,55	3,44	2,63	4,48		
	no or low educational degree	69	4,68	3,69	3,80	5,57		
	Total	238	3,44	3,45	3,00	3,88		
dmft	University degree	12	1,92	2,68	,21	3,62	2,763	,043
	secondary school educational	101	2,53	3,55	1,83	3,24		
	middle school educational	56	2,00	2,57	1,31	2,69		
	no or low educational degree	69	3,59	3,67	2,71	4,48		
	Total	238	2,68	3,38	2,25	3,12		

Tab. 12: DMFT/dmft values in relation to mothers' educational level.

Group III

Clinical examination

The analyzed sample consisted of 38 children undergoing liver transplantation (mean age 5.63±1.27) which were compared with 78 mached age healthy subjects (mean age 5.87±1.04) and randomly selected from public schools of the Regional Campanian district.

Caries prevalence was 78,95% in liver transplantation group and 44.7% in healthy control group. In the liver transplantation group, dmft mean value was 2.26±2.25 with maximum and minimum values of 8 and 0, respectively. In the healthy group dmft mean value was 0.69±1.51 with maximum and minimum values of 7 and 0, respectively (tab.13). The difference in dmft mean between the two groups was statistically significant ($p<0.0001$) (tab.13). The distribution of dmft index components is showed in table 13. The values for decayed teeth, missing teeth and filled teeth were 1.18±1.57 and 0.46±1.17, 0.74±1.31 and 0.12±0.70, 0.34±0.94 and 0.05±0.32 in liver transplantation and healthy groups, respectively. There was statistically significant difference between two groups in all the dmft components (tab.13).

						95% Confidence Interval for Mean			
		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	F	Sig.
dmft	healthy group	78	0.69	1.51	0.17	0.35	1.03	19.85	.000
	liver tranplantation group	38	2.26	2.25	0.37	1.52	3.01		
	Total	116	1.21	1.92	0.18	0.85	1.56		
decayed	healthy group	78	0.46	1.17	0.13	0.19	0.73	7.71	.006
	liver tranplantation group	38	1.18	1.57	0.26	0.66	1.71		
	Total	116	0.69	1.35	0.13	0.45	0.95		
missing	healthy group	78	0.12	0.70	0.08	0.04	0.27	11.10	.001
	liver tranplantation group	38	0.74	1.31	0.21	0.31	1.17		
	Total	116	0.32	0.98	0.09	0.14	0.50		
filled	healthy group	78	0.05	0.32	0.04	0.02	0.12	6.1	.015
	liver tranplantation group	38	0.34	0.94	0.15	0.03	0.65		
	Total	116	0.15	0.61	0.06	0.03	0.26		

Tab. 13: dmft index and the distribution of its components for healthy and liver transplantation group.

Periodontal health data elaboration showed that 23.7% of the liver transplantation subjects and 48.7% of the controls had healthy periodontal status. 39.5% of the liver transplantation children and 25.6% of the controls had plaque and calculus. 44.7% of the liver transplantation patients and 28.2% of the control subjects showed bleeding on probing (fig.10).

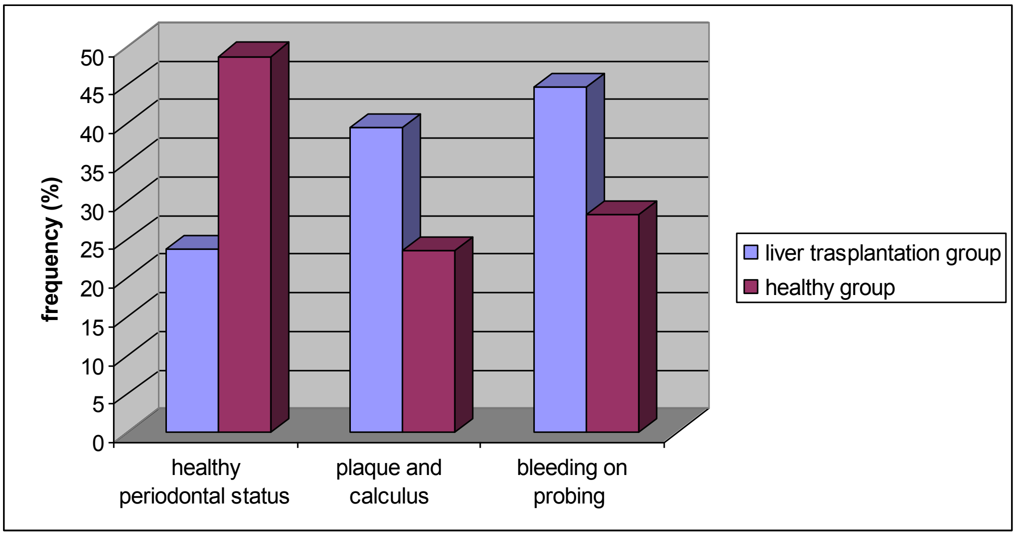

Fig. 10: CPI values in children undergoing liver transplantation.

Logistic regression analysis showed that there was no statistical difference between liver transplantation subjects and healthy subjects for presence of bleeding on probing and plaque and calculus.

Dental enamel defects data elaboration showed that 65.8% of the liver transplantation children had enamel defects respect to 21.8% of control group. In liver transplantation group, the most prevalent defect was greenish discoloration presented in 36.8% of the subjects. This defects was recorded in no one of the control subjects. Marked opacity white/cream was presented in 5.3% of the liver transplantation group in comparison to 8.9% of control group while the irregular diffused opacity was recorded in 13.2% of liver transplantation subjects and in 7.7% of healthy subjects (fig. 11).

Furthermore, hypoplasia with enamel loss was presented in 21% of liver transplantation patients, while in no one of the control subjects. Besides, the opacity yellow/brown was recorded in the 2.6% of liver transplantation subjects and in the 5.1%. of healthy subjects, respectively (fig.11).

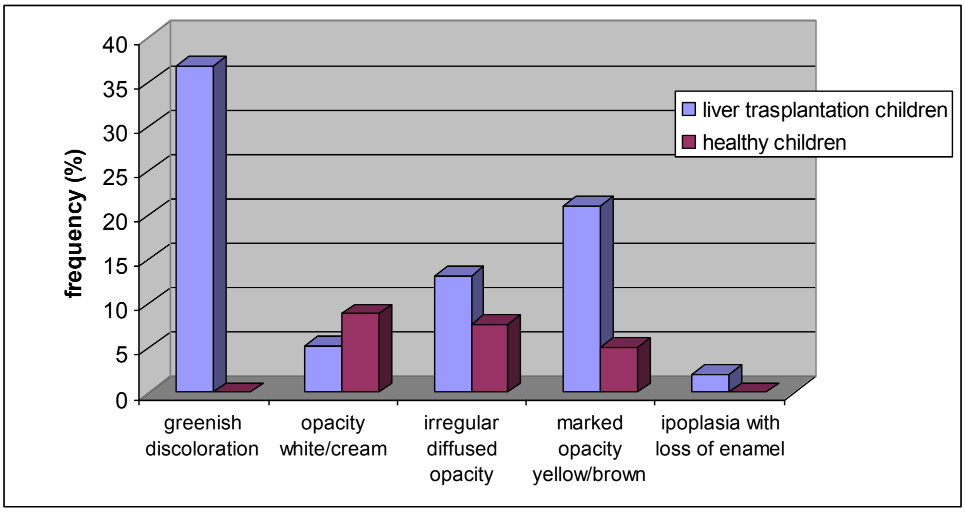

Fig. 11: Distribution of enamel dental defects.

Logistic regression analysis showed a statistically significant difference between the two groups for the presence of dental enamel defects (OR:6.9; CI=2.9-16.2) (tab.14).

	Sig.	OR	95,0% C.I.for EXP(B)	
			Lower	Upper
DDE	,000	6,900	2,923	16,292
	,056	,520		

Tab.14: Difference between the two groups for the presence of dental enamel defects

Questionnaire data

There was no statistical difference between the two groups for oral health behaviour. Before this study, only 21.05% of healthy children and 24.36% of children with liver transplantation had received a dental examination.

In both groups, the mean caries experience of the children with a history of recent dental visit was significantly higher compared to children who had never been to the dentists (tab.15). No difference in gingival health was observed across dental visit habits.

		Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
				Lower Bound	Upper Bound		
dmft	no dental visit before the study	,75	1,49	,49	1,99		
	dental visit before the study	2,67	2,26	1,82	3,51	5,088	,030
	total	2,26	2,25	1,52	3,00		

Tab. 15: dmft values in relation to dental visit before the study.

89% of control group and 92% of liver transplantation group reported the use of fluoridated toothpaste, but differences in caries level can not be observed between users of fluoridated and non-fluoridated toothpaste. Only in 18.42% of liver transplantation subjects and 19.23% of healthy subjects, parents personally washed their children's teeth at least once a day.

There were no statistical difference between both groups for consumption of sugary. No differences in caries levels and gingival health were observed in relation to eating habits.

Finally, family socio-economic level was similar for the two groups; 31.6%, 44.7% and 23.7% of liver transplantation group had high, medium and low family income, respectively.

In healthy group, the family income was high for 23.1%, medium for 46.2% and low for 30.7%.

Group IV

Clinical examination

The analyzed sample consisted of 124 asthmatic subjects with mild intermittent form and mild persistent form (mean age 9.11±1.53) which were compared with 156 mached age healthy subjects (mean age 8.78±1.43) and randomly selected from same public schools of Group I.

Caries prevalence was 38.7% in asthmatic group and 35.9% in healthy control group. In asthmatic children DMFT mean value was 1.25±1.82 with maximum and minimum values of 6 and 0, respectively. In healthy subjects DMFT mean value was 1.03±1.60 with maximum and minimum values of 6 and 0, respectively. The difference in mean DMFT between the two groups was not statistically significant. Table 16 shows DMFT index and the distribution of its components. There was no statistical difference between asthmatic and healthy subjects for decayed teeth (0.71±1.17 *cf* 0.67±1.20), missing teeth (0.04±0.32 *cf* 0.07±0.43) and filled teeth (0.48±1.15 *cf* 0.32±0.96).

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
					Lower Bound	Upper Bound		
DMFT	healthy group	156	1,03	1,60	,78	1,29	1,137	,287
	asthmatic group	124	1,25	1,82	,93	1,57		
	Total	280	1,13	1,70	,93	1,33		
decayed teeth	healthy group	156	,67	1,20	,48	,86	,066	,798
	asthmatic group	124	,71	1,17	,50	,92		
	Total	280	,69	1,19	,55	,83		
missing teeth	healthy group	156	,07	,43	,00	,14	,427	,514
	asthmatic group	124	,04	,32	,02	,10		
	Total	280	,06	,38	,01	,10		
filled teeth	healthy group	156	,32	,96	,17	,47	1,519	,219
	asthmatic group	124	,48	1,15	,27	,68		
	Total	280	,39	1,05	,27	,51	0	5

Tab. 16: DMFT index and the distribution of its components for healthy and asthmatic group.

In asthmatic group dmft mean value was 1.10±1.89 with maximum and minimum values of 8 and 0, respectively. In healthy subjects dmft mean value was 0.90±1.72 with maximum and minimum values of 7 and 0, respectively. The difference in mean dmft between the two groups was not statistically significant (tab.17). Distribution of dmft index components is showed in table 17. The values for decayed teeth, missing teeth and filled teeth were 0.53±1.14 and 0.49±1.14, 0.35±1.05 and 0.24±0.89, 0.67±0.04 and 0.69±0.07 in asthmatic and healthy group, respectively. There was no statistical difference between two groups in no one of dmft components (tab.17).

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
					Lower Bound	Upper Bound		
dmft	healthy group	156	,90	1,72	,62	1,17	,847	,358
	asthmatic group	124	1,10	1,89	,76	1,43		
	Total	280	,99	1,80	,77	1,20		
decayed teeth	healthy group	155	,49	1,16	,31	,68	,170	,680
	asthmatic group	124	,55	1,17	,34	,76		
	Total	279	,52	1,17	,38	,65		
missing teeth	healthy group	156	,24	,89	,10	,38	,790	,375
	asthmatic group	124	,35	1,05	,16	,53		
	Total	280	,29	,96	,18	,40		
filled teeth	healthy group	156	,18	,69	,07	,29	,050	,824
	asthmatic group	124	,16	,67	,04	,28		
	Total	280	,17	,68	,09	,25	0	4

Tab. 17: Dmft index and the distribution of its components for healthy and asthmatic group.

CPITN data elaboration showed that 36.3% of the asthmatic subjects and 44.9% of the controls had a healthy periodontal status. 41.9% of the asthmatic children and 28.2% of the controls had plaque and calculus. 21.8% of the asthmatic patients and 26.9% of the control subjects showed bleeding on probing (fig. 12).

Logistic regression analysis showed that there was no statistical difference between asthmatic subjects and healthy subjects for CPITN values.

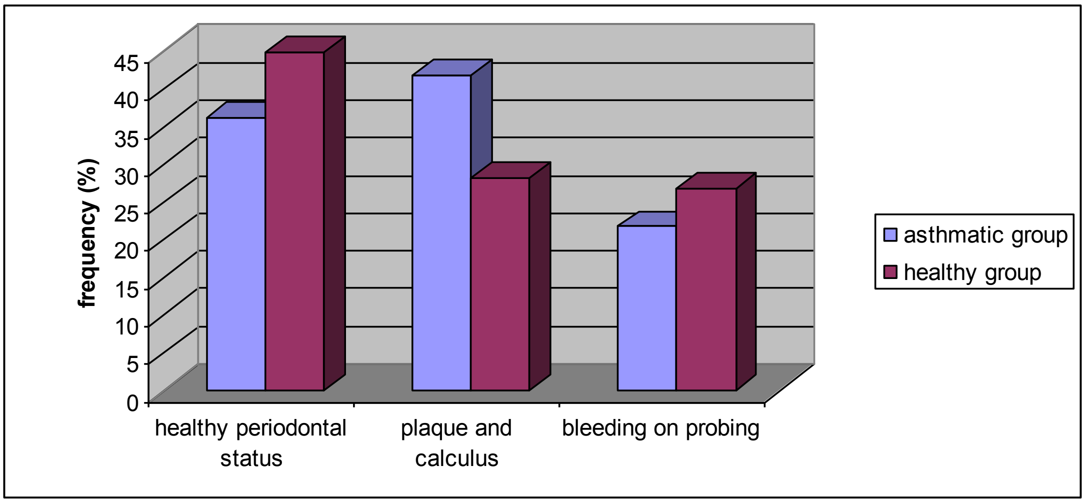

Fig. 12: CPITN values in asthma patients and healthy controls.

30.64% of the asthmatic subjects with mild intermittent form and mild persistent form had dental enamel defects in comparison to 21.15% of the healthy subjects. In particular, 14.52% of the asthmatic children had marked opacity white/cream, 8.06% had irregular diffused opacity, 5.64% had marked opacity yellow/brown and 2.42 hypoplasia with loss of enamel (fig.13). In the control group marked opacity white/cream were recorded in 12.18%, irregular diffused opacity in 5.13%, marked opacity yellow/brown in 2.56 and hypoplasia with loss of enamel in 1.28% (fig.13). Although the defects were more prevalent in the asthmatic patients, logistic regression analysis showed that there was no statistical difference between the two groups for DDE values.

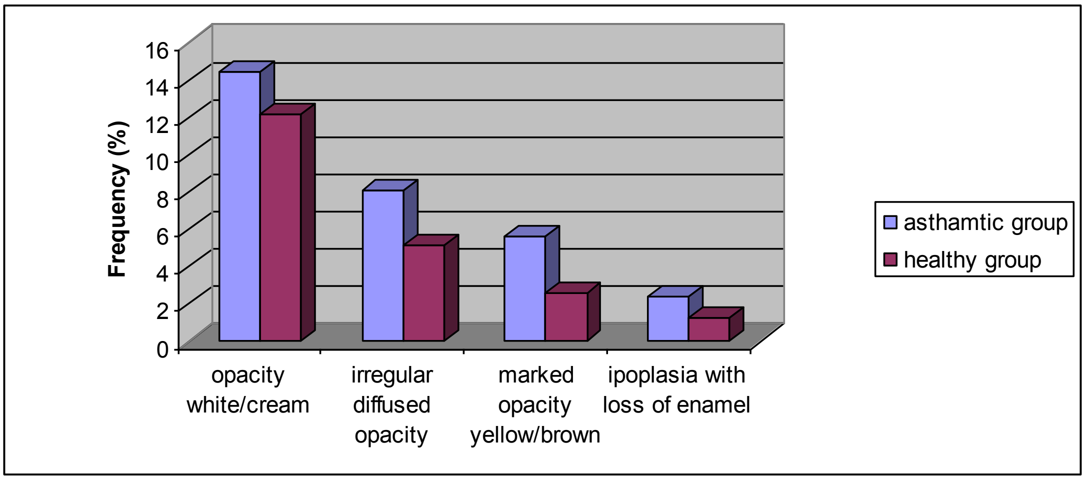

Fig. 13: Distribution of enamel dental defects.

Questionnaire data

Questionnaire data elaboration showed that 73.8% of asthmatic children received a dental examination before this study.

There was no statistical difference between both groups for oral health behaviour.

55.4% of asthmatic children didn't brush teeth immediately after eating. Analysis of the sample showed that an increase of sugary intake expanded the risk of tooth decay; in fact, dmft was 0.25±0.46 in children, who never ate sweet foods, 0.0 in those who ate sugary only once a day, 1.13±2.58 in those who consumed sweet foods twice a day, and then was equal to 2.20±4.02 for children who ate sugary three or more times a day (fig.14). Similarly, DMFT value was equal to 0.13±0.35 in children who never ate cakes, 1.06±1.78 in those who consumed sweet food once a day and 0.78±1.54 in subjects who ate sweet food twice a day and 0.80±1.42 in children who consumed sugary three or more times a day (fig.14).

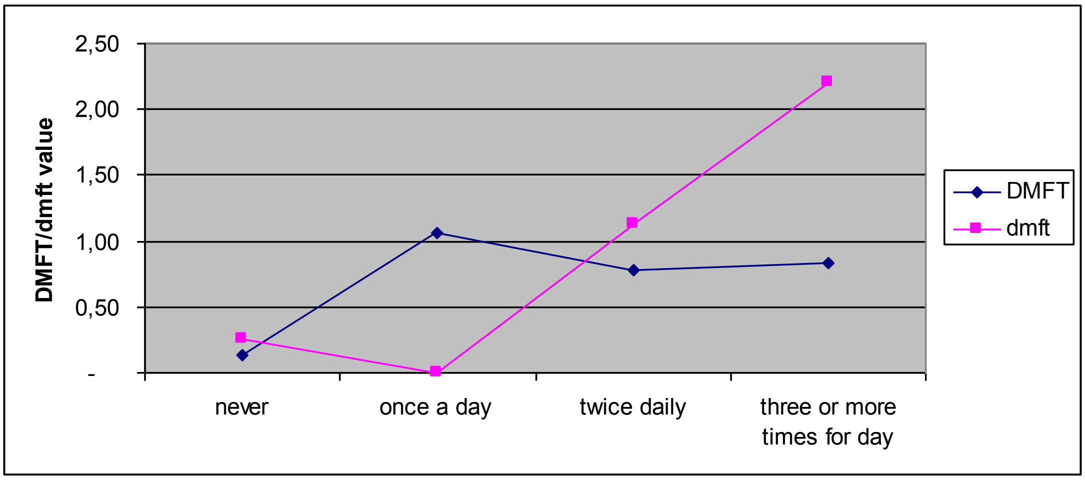

Fig. 14: DMFT/dmft value in relation to increase of sugar intake.

In asthmatic group, the relation between caries experience and drugs used for asthma's treatment was analyzed; antihistamines were used in 23.76% of asthmatic children, $\beta_2$agonists in 19.9%, inhaled corticosteroids in 19.8% while oral corticosteroids in 12.87%. In addition, Leukotriene receptor antagonists were used in 14.85%, mite vaccine in 4.95% and antibiotcs in 2.99%.

DMFT/dmft value in relation to drugs was analyzed in fig. 15.

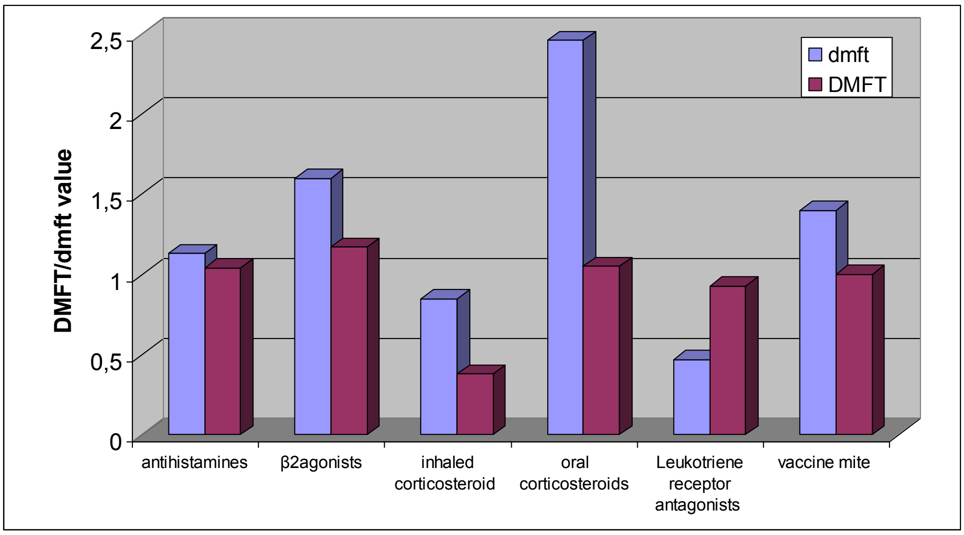

Fig. 15: DMFT/dmft value in relation to drugs used for asthma's treatment.

Similarly to healthy group, the family socio-economic level of group IV was high in 9.5%, medium-high in 15.6%, medium in 36.5%, medium-low in 22.7%, low in 15.7% (fig.16).

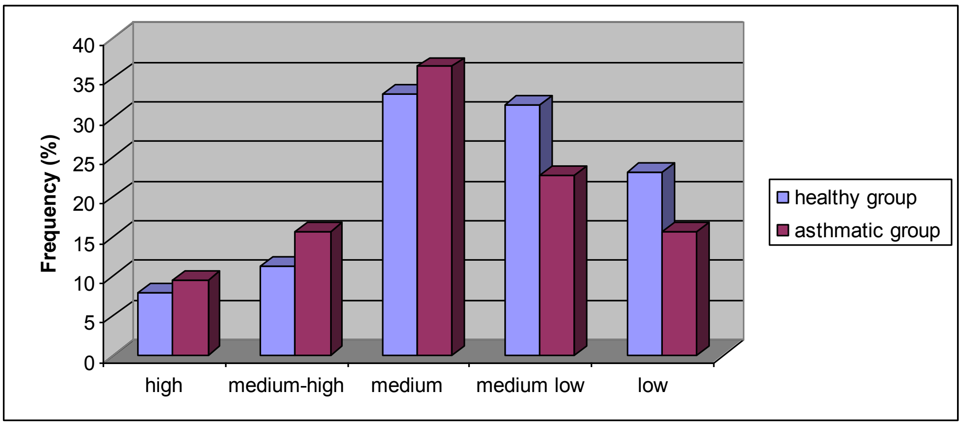

Fig. 16: Distribution of family income in healthy and asthmatic group.

It is evident that family socio-economic level and mothers' educational level influenced DMFT/dmft value; in fact, low income levels and low mothers' level of education were associated with higher values of DMFT/dmft index (fig.17 and 18).

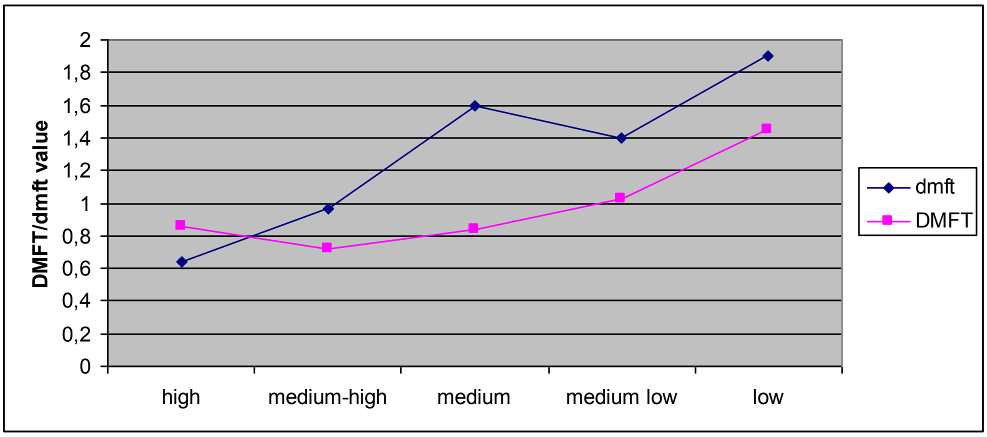

Fig. 17: DMFT/dmft value in relation to family income.

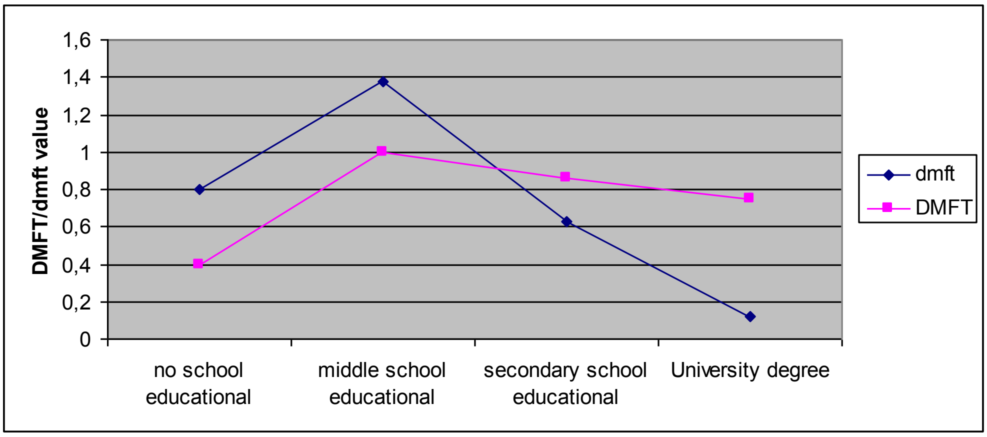

Fig. 18: DMFT/dmft value in relation to mothers' level of education.

Group V

Clinical examination

The analyzed sample consisted of 54 children affected by cystic fibrosis (mean age 8.76±1.53) which were compared with 101 healthy subjects (mean age 8.47±1.42) matched age and randomly selected from same public schools of group I.

The results have shown that the mean value of DMFT was 1.13±1.82 in the CF patients and 0.95±1.53 in the healthy subjects (fig.19).

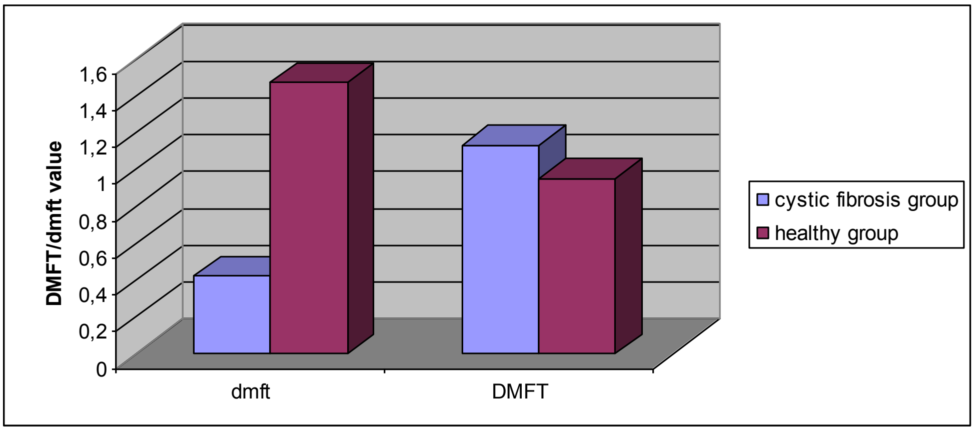

Fig. 19: DMFTand dmft values in cystic fibrosis children and healthy controls.

In primary teeth the CF children showed a dmft mean value of 0.41±0.88, significantly lower than the values of the control group (1.47±1.97) (p<0.001) (fig.19 e tab.18).

		Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
				Lower Bound	Upper Bound		
DMFT	cystic fibrosis group	1,13	1,82	,63	1,63		
	healthy group	,95	1,53	,65	1,25	,423	,517
	Total	1,01	1,63	,75	1,27		
dmft	cystic fibrosis group	,41	,88	,17	,65		
	healthy group	1,47	1,97	1,08	1,85	14,073	,000
	Total	1,10	1,74	,82	1,37		

Tab. 18: DMFT/dmft values for healthy and cystic fibrosis group.

CPITN data elaboration showed that the 51.8% of the CF subjects and the 46.5% of the controls had healthy periodontal status. 22.3% of the CF patients and 25.8% of the control subjects showed bleeding on probing. 25.9% of the CF children and 27.7% of the controls had calculus (fig.20).

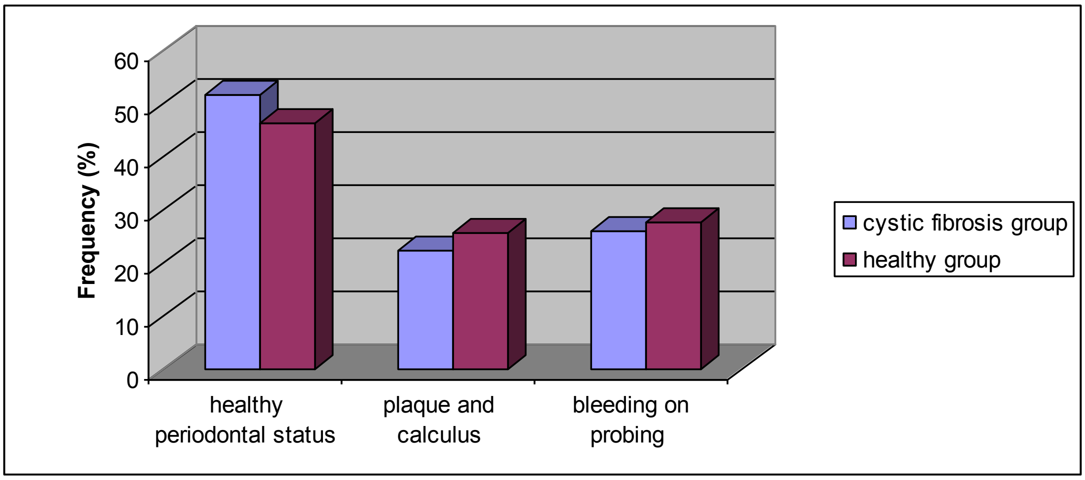

Fig. 20: CPITN values in cystic fibrosis children and healthy controls.

57.4 % of the subjects affected by CF had enamel defects in comparison to 16.8% of the healthy subjects. In particular, 22.2% of the CF patients had hypoplasia with loss of enamel, 16.6% had marked opacity white/cream, 9.2% had marked opacity yellow/brown, 3.7% had irregular diffused opacity and 5.5% had hypoplasia pits.

The control group had hypoplasia with loss of enamel in 0.99%, marked opacity white/cream in 7.9%, marked opacity yellow/brown in 2.97%, irregular diffused opacity in 4.95%. In healthy group the ipoplasia pits wasn't recorded.

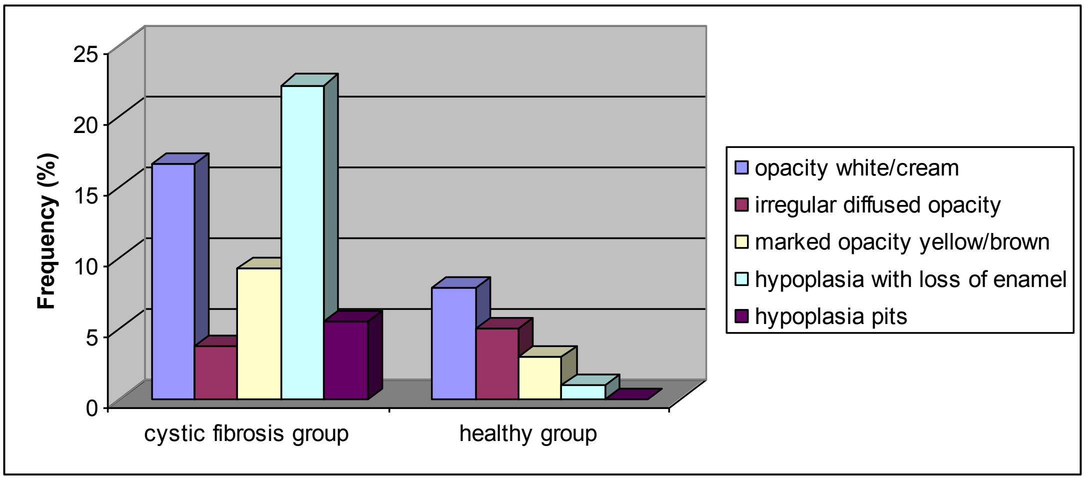

Fig. 21: Distribution of enamel dental defects in cystic fibrosis and healthy groups.

Questionnaire data

There was no statistical difference between the two groups for oral health behaviour. Questionnaire data elaboration showed that the 53.7% of cystic fibrosis group and 68.3% of healthy group received a dental examination before this study.

It is interesting to note that, in cystic fibrosis group, DMFT/dmft mean of children with a history of recent dental visit (1.07±1.93 and 0.14±0.35) was lower than children who had never been to the dentists (1.20±1.73 and 0.72±1.17), while, in healthy group, DMFT/dmft mean of children with a history of recent dental visit (0.94±1.49 and 1.54±1.96) was higher than children who had never been to the dentists (1.06±1.73 and 1.22±2.05).

		Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
				Lower Bound	Upper Bound		
DMFT	dental examination before this study	1,07	1,93	,34	1,80		
	no dental examination before this study	1,20	1,73	,49	1,91	,068	,795
	Total	1,13	1,82	,63	1,63		
dmft	dental examination before this study	,14	,35	,00	,27		
	no dental examination before this study	,72	1,17	,24	1,20	6,483	,014
	Total	,41	,88	,17	,65		

Tab. 19: DMFT/dmft values in relation to dental examination before study in cystic fibrosis group.

		Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
				Lower Bound	Upper Bound		
DMFT	dental examination before this study	,94	1,49	,61	1,27		
	no dental examination before this study	1,06	1,73	,19	1,92	,085	,772
	Total	,96	1,53	,66	1,26		
dmft	dental examination before this study	1,54	1,96	1,11	1,97		
	no dental examination before this study	1,22	2,05	,21	2,24	,373	,54
	Total	1,48	1,97	1,09	1,87		

Tab. 20: DMFT/dmft values in relation to dental examination before study in healthy group.

In cystic fibrosis children, 9.3% ate sweet foods only once a day, 51.9% consumed sugary twice a day, 20.4% ate sweet foods three or more times a day and 18.5% never ate sugary while, in healthy group, 50.5% ate sweet foods only once a day, 32.6%consumed sugary twice a day, 11.8% ate sweet foods three or more times a day and 4.9% never ate sugary.

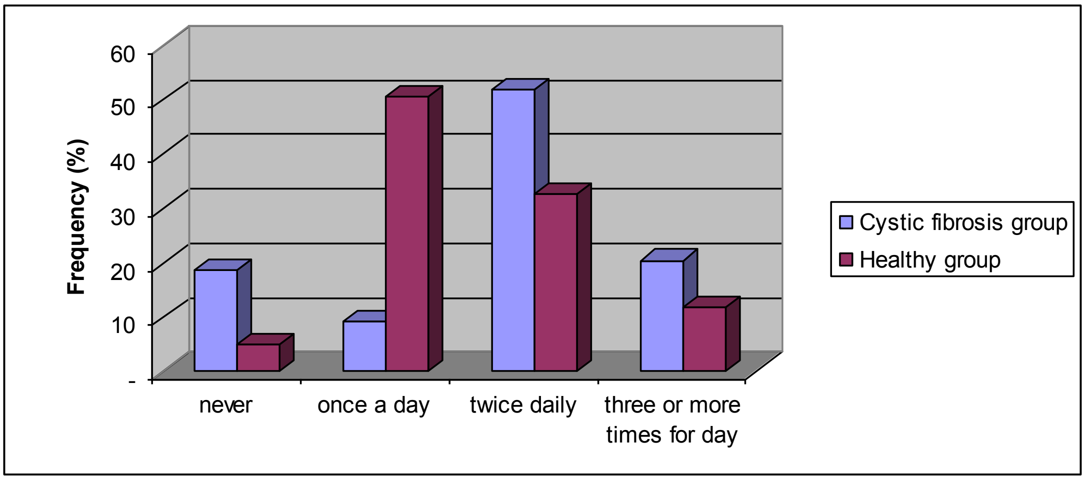

Fig. 22: Distribution of cystic fibrosis and healthy children in relation to sugary intake.

Analysis of the sample showed that an increase of sugary intake expanded the risk of tooth decay; in fact, dmft was 0.20±0.42 in children who never ate sweet foods, 0.0 in those who ate sugary only once a day, 0.43±0.92 in those who consumed sweet foods twice a day, and then was equal to 1.82±1.78 for children who ate sugary three or more times a day (p<0.001) (tab.21). Similarly, DMFT value was equal to 0.70±1.16 in children who never ate cakes, 0.80±1.30 in those who consumed sweet food once a day, and 1.14±2.01 in subjects who ate sweet food twice a day and 1.64±2.06 in children who consumed sugary three or more times a day (tab.21).

				95% Confidence Interval for Mean			
		Mean	Std. Deviation	Lower Bound	Upper Bound	F	Sig.
DMFT	never	,70	1,16	-,13	1,53		
	once a day	,80	1,30	-,82	2,42		
	twince daily	1,14	2,01	,36	1,92	,509	,678
	three or more times for day	1,64	2,06	,25	3,02		
	Total	1,13	1,82	,63	1,63		
dmft	never	,20	,42	-,10	,50		
	once a day	,00	,00	,00	,00		
	twince daily	,43	,92	7,18E-02	,79	6,091	,001
	three or more times for day	1,82	1,78	,62	3,01		
	Total	,63	1,20	,30	,96		

Tab. 21: DMFT/dmft values in relation to intake in cystic fibrosis group.

DISCUSSION

Epidemiology is fundamental in dental care planning. In this epidemiological study it was possible to estimate, in detail, caries prevalence in children campanian population. Burt describes the benefits of cross-sectional data [Burt, 1997]. When these surveys are repeated periodically under generally similar conditions (like these surveys), broad oral health trend over time can be estimated. For this reason, in this study, the WHO criteria were used. The simultaneous conduct of epidemiological investigation allowed to reduce the time of the study and to show a more complete overview of campanian oral health status. Additionally, in order to avoid introducing a age's bias, Group III, IV and V were compared with mached age healthy children and randomly selected from public school of the Regional Campanian district. The results of this study showed particular considerations for each group.

Group I

The results observed showed that the onset and development of dental disease decreased and achieved the WHO goals in 2010. The World Health Assembly set the global average for dental caries experience in 12-year-old children should not be higher than 3.0 in the year 2000 and a DMFT ≤ 1 for 2010 [Hobdell et al., 2000]. The cohorts surveyed, already achieved this goal. Mean DMFT values were 0.09 ± 0.42 and 1.17 ± 1.96 for 6 and 12 years old, respectively and were similar to values recorded in other Italian regions, achieving an important result for oral health in children [Vezzoni et al., 2005]. Despite in Italy, there aren't national preventive programmes for oral health status, the percentage of caries-free children was 64.2%. Caries prevalence still remains at a high level for a certain percentage of subjects (SIC = 3.42±1.97). The prevalence of dental caries and bad periodontal health status increased with age (fig. 23 and 24, tab. 21).

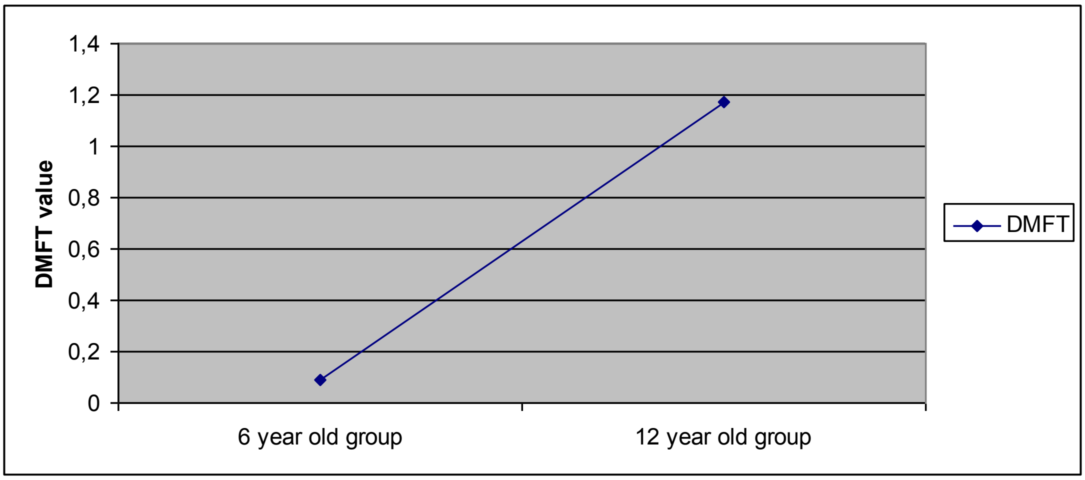

Fig. 23: DMFT value in relation to age.

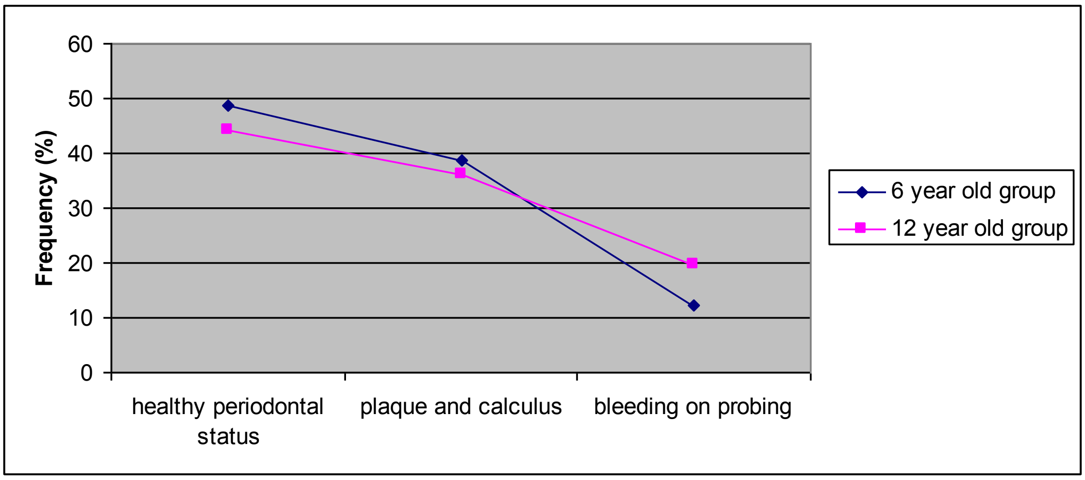

Fig . 24: Periodontal health status in relation to age.

DMFT

	Mean	Std. Deviation	95% Confidence Interval for Mean		F	Sig.
			Lower Bound	Upper Bound		
6 year old group	,09	,42	,05	,14		
12 year old group	1,17	1,96	,98	1,35	110,922	,000
Total	,66	1,56	,56	,77		

Tab. 21: DMFT values in relation to age.

It is interesting to note that, in both sub-group, the subjects who received dental examination before this study have higher DMFT/dmft values than those who had never been to the dentist; then, the subjects undergoing dental visits only when necessary and, rarely, for a preventive control.

In addition, the results of this study supported the importance of sugary and soft drink intake on risk of tooth decay; in fact, the higher consume of sweet foods and soft drink increased significantly the risk of tooth decay ($p<0.001$) (tab. 6).

This data were alarming considering that children, today, changed their nutrition increasing the consumption of sweet foods and soft drink [Balcells et al., 2010]. Therefore, the erosive action of soft drinks on dental enamel is confirmed within the children campanian population analyzed.

It is interesting to note that family had a important role in oral education of children; in fact, 87.3% of parents instructed their children on how to brush their teeth. The children, who learned how to properly clean their teeth, had a DMFT value lower than those that were not instructed on correct toothbrushing (tab.4). In addition, family solidity influenced significantly caries experience (tab.5); caries experience was higher in subjects which didn't live with both parents respect to those which lived with both parents. It is possible that separated parents, involved in their problems, neglect of oral hygiene of their children. Finally, this study confirmed that cultural and socio-economic factors influenced caries prevalence and healthy periodontal status ($p<0.001$). It is interesting to note mother's important role in campanian family for children education; caries prevalence values decreased with higher parents' level of education, but it was statistically significant only for mothers ($p<0.001$) (tab.8).

Finally, DDE data elaboration showed that there was no statistical difference for dental enamel defects in relation to fluoride assumption during grow. This could be due to the presence of many factors responsible of dental enamel defects in the population analyzed. For this reason, this correlation was difficult to be analyzed in this study.

Group II

DMFT of Group II (children recruited randomly from volunteer patients at Paediatric Dentistry Department of "Federico II" University of Naples) was 3.43±3.67. This value was similar to SIC value of Group I (3.42±1.97).

Group II is, therefore, the one-third of the population with the highest DMFT that need more attention. Exploring the characteristics of this group, makes it possible to devise new methods of prevention. Similarly to group I, in group II the prevalence of dental caries and bad periodontal health status increased with age (fig.25 and 26).

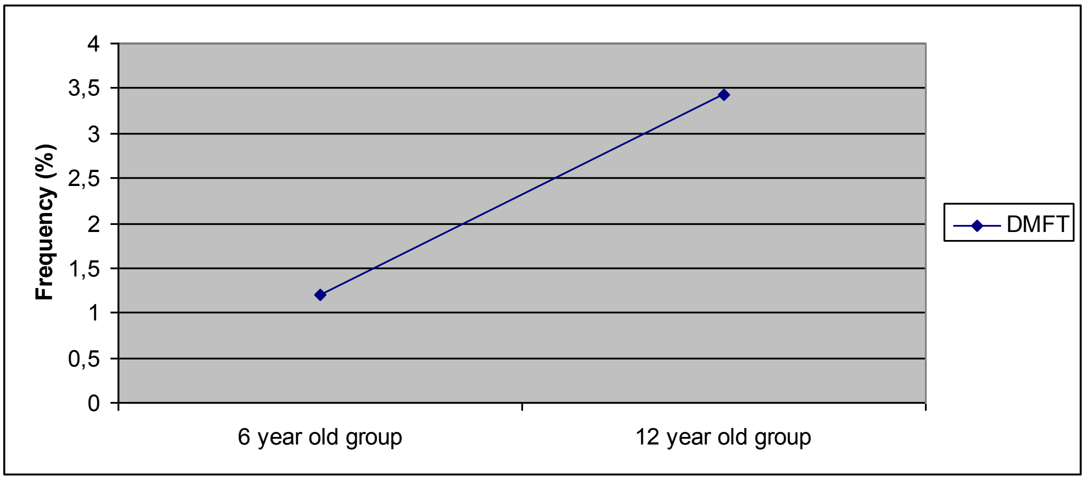

Fig. 25: DMFT value in relation to age.

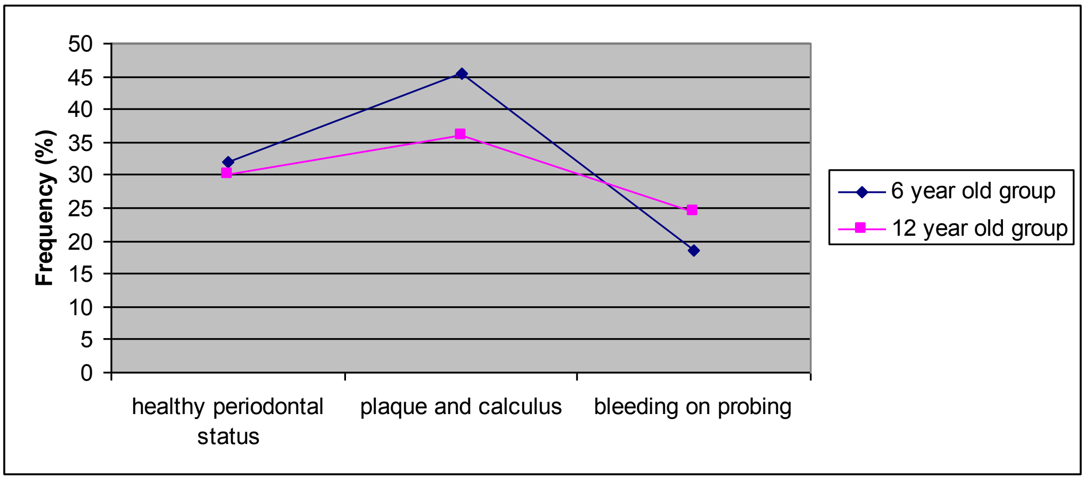

Fig . 26: Periodontal health status in relation to age.

In group II, like group I, a correlation between caries experience and consumption of sugary was found; it is evident that increasing in sugary intake expanded the tooth decay risk.

In group I and II, family socio-economic level influenced significantly caries experience. It is just interesting to note the difference between group I and group II. The family socio-economic level was different between group I and group II. In fact, in group II, less than 2% belonged to medium-high income level, 45.4% belonged to medium level, 21.5% belonged to a medium-low level, 31.1% were patients of low level while, in group I, 8% belonged to high income level, 11.3% belonged to medium-high income level, 33.0% to medium level, 31.7% belonged to a medium-low level, 23.1% were subjects of low level (fig.27).

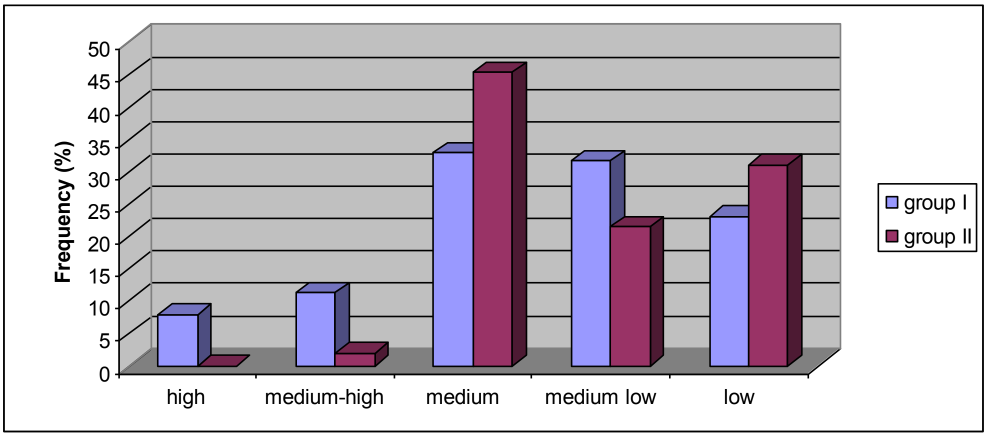

Fig. 27: Distribution of family income.

Caries experience was influenced by parents' educational level attainment (no school educational, middle, secondary, University degree): caries prevalence values decreased with higher parents' level of education, but it was statistically significant only for mothers ($p<0.001$) (tab.8 and 12). Mothers' educational level was different between group I and group II; in fact, in group I, 1.6% of mothers had no or a low educational degree, 41.7% had a middle school education, 38.5% had a secondary school educational level and 16,5% had a University degree. In group II, 53.8% of mothers had a middle school education, 19.9% had a secondary school educational level, less than 5% a University degree while 21.6% had no or a low educational degree (fig.28).

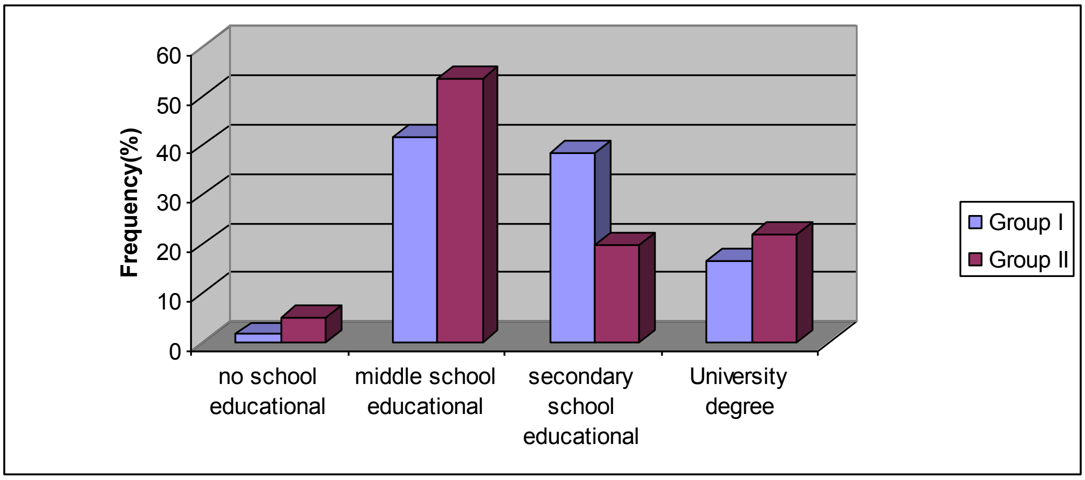

Fig.28: Distribution of mothers' educational level.

It is evident how oral prevention must involve the whole family, starting from parents who can thus teach their children proper hygiene habits.

Today available preventive systems (fluoride prophylaxis; fluoride toothpastes; control of oral hygiene; reduction of tooth-cariogenic foodstuff; sealing), despite being partly responsible for the reduction of the prevalence disease, haven't succeeded in penetrating effectively this social layers of population. For this reason, research in tooth decay prevention, in the last few years, is devoting itself to the elaboration of a new strategy able to have a greater applicability and so greater effectiveness.

Group III

This survey analysed the relationship between paediatric liver transplantation and several aspects of oral health: caries, periodontal status and dental enamel defects.

The results of the investigation show that children undergoing liver transplantation have a higher caries prevalence, gingivitis and dental enamel defects respect to the healthy control group.

These data were in line with previous studies, which show a correlation between liver pathology and dental caries, sustaining the hypothesis that the presence of systemic diseases in early childhood may interfere with a correct development of hard tissues such as teeth, constituting a risk factor for dental diseases [Crombie et al., 2009].

In this study, the liver transplantation group shown not only the higher caries prevalence, but also a greater severity of this disease respect to the healthy group; in fact in the liver transplantation group, 46.4% of tooth decay needed the endodontic therapy respect to 23% recorded in the control group. It is, also, possible that in these subjects there are not only a green-stained tooth structure, but also a ipo-maturation of dental tissue.

In fact, presence of liver disease during amelogenesis may cause alterations in the enamel ultrastructure because ameloblasts are cells extremely sensitive to environmental alterations [Kellerhoff and Lussi, 2004]. Such alterations may, in turn, be associated with modifications in the physicochemical behavior of enamel, thereby making it more susceptible to faster progression of demineralization [Takahashi et al., 2009].

Therefore, in liver transplantation subjects, because of high dental tissue destruction, dental abscesses with possible serious consequences for transplant are frequent.

It is interesting to note that, despite higher prevalence of oral diseases, only 24.36% of the liver transplantation children had received a dental examination before this study. All these liver transplantation children were examined by dentists because they showed severe dental abscesses; it highlights the lack of dental caries prevention programs for these patients.

Periodontal health data elaboration showed that only 23.7% of the liver transplantation subjects respect to 48.7% of the controls had a healthy periodontal status. It is possible that poor oral hygiene is the sole responsible for the high prevalence of gingivitis. In fact, periodontal diseases could not be due to immunosuppressive therapy that these patients undergo. In fact, all liver transplantation children examined in this survey were on immunosuppressive regimen with Tacrolimus, a immunosuppressive agent, approved for use in solid-organ transplants, not associated with gingival overgrowth [Wondimu et al., 2001].

It is plausible that due to long hospitalizations and serious systemic discomforts, parents are disinterested in their children's oral hygiene, since only 18.42% of parents of liver transplantation subjects personally washed their children’s teeth at least once a day.

In addition, dental enamel defects data elaboration showed that there is a significant difference in enamel defects between the two groups. In this study, 65.8% of the liver transplantation children had enamel defects respect to 21.8% of the control group.

It is likely that higher prevalence of green-stained teeth appears to be associated with fetal or neonatal hyperbilirubinemia as a result of chronic liver failure. One of the manifestations of these disorders is the elevated serum levels of bilirubin (hyperbiliru-binemia), a product of hemoglobin degradation, which is deposited in different tissues, including mineralized and soft tissues.

When hyperbilirubinemia occurs dental development, teeth can develop a green coloration, which remains permanently, because, after maturation, dental tissues loose their metabolic activity.

89.5% of liver transplantation children had a biliary atresia ; this could explain higher presence of greenish discoloration recorded. In addition, stained cases showed various degrees of green staining in the primary dentition suggesting a correlation between the degree of tooth staining and the severity of disease [Lin et al., 2003].

Further aesthetic problems of stained teeth probably need to be solved by using composite resin, veneered crown, and laser whitening procedures as the children grow older [Rosenthal et al., 1986].

Group IV

The obtained findings showed that children suffering from mild intermittent and mild persistent asthma, despite its disease status and its pharmacotherapy, did not appear to be at higher caries experience when compared with healthy control group. In fact, DMFT and dmft mean values were similar in both groups. These data were in line with previous studies, which did not show a correlation between bronchial asthma and dental caries, sustaining the hypothesis that asthmatic pathology did not constitute a risk factor for tooth decay [Meldrum et al., 2001; Shulman et al., 2001]. Instead, several studies suggested that people with asthma had a greater rate of caries development than their non-asthmatic counterparts [Arnrup et al., 1993]. This phenomenon was attributed to prolonged use of ß2 agonists, which was associated with diminished salivary production and secretion [Shashikiran et al., 2007; Ryberg et al., 1991; Maguire et al., 1996].

It is possible that the discordant data, in literature, were due to the difficulty to examine the relationship between the asthmatic condition and caries prevalence; in fact, the asthma disease, its severity, and the medication often fluctuated over time according to seasons. Furthermore, the start of the asthmatic disease was difficult to assess. Several researches, present in literature, were unable to demonstrate any connection between the severity of the asthma, the period of exposure to medication, and the caries prevalence. In fact, these studies showed several limitations as an unequal distribution of patients according to the severity of asthma [Stensson et al., 2008; Ersin et al., 2006]. Therefore to decrease this limit, in the present study only patients with mild (66) and medium (58) degree of severity of asthma were selected.

In the present study, a higher prevalence of gingivitis was recorded in the asthmatic group in comparison with the controls; however, the difference between the two groups was not statistically meaningful.

The gingivitis in the asthmatic children could be due to several factors.

The first one was represented by an altered immune response. In fact, the concentration of IgE in gingival tissue was found to be elevated in patients with asthma, which caused periodontal destruction; also an enzyme group which is involved in inflammation, the arginine aminopeptidases, was found to be slightly elevated in the gingival fluid of asthmatic children, indicating that gingival inflammation was increased in asthma [Hyppa et al., 1984].

Moreover, the tendency to breathe through the mouth could cause the dehydration of alveolar mucosa, resulting in a worsening of the oral condition [Hyppa et al., 1984].

Finally, the use of inhaled steroids has been linked to increased levels of gingivitis [McDerra et al., 1988].

Furthermore, our results, showing that a higher quantity of tartar and plaque wasn't recorded in asthmatic children respect to the control group, were in discordance with other studies who found a higher prevalence of calculus in asthmatic children, due to increased levels of calcium and phosphorous in submaxillary saliva and parotid saliva [Mandel et al., 1969].

Also, other reports suggested that respiratory disorders were associated with dental enamel defects [Kellerhoff and Lussi, 2004].

However, few studies presented epidemiological data regarding its prevalence in children with asthma and few researches, investigating the potential role that pharmacological treatment plays in this association, were conducted.

The prevalence of enamel dental defects, in this study, was higher in asthmatic group respect to control group. Logistic regression analysis showed that there was no statistical difference between asthmatic subjects and healthy subjects for DDE values.

In both groups the type of dental enamel defects recorded was the same (fig.29).

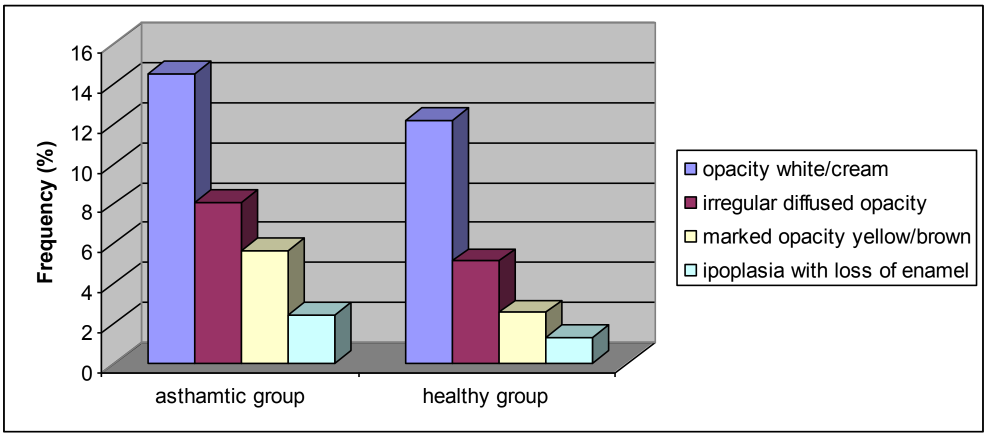

Fig.29: Distribution of enamel dental defects.

On this matter, our findings are in agreement with those of another group of authors, [Guergolette et al., 2009; Van Amerongen and Kreulen, 1995] who observed that the presence of demarcated opacities is the defect with higher prevalence. Studies hypothesize that since ameloblasts are highly sensitive to oxygen supply, paediatric asthma patients with dental enamel defects have probably experienced previous episodes of oxygen deprivation [Kellerhoff and Lussi, 2004; Jälevik, 2001]. Therefore, these defects might be related to the disease itself rather than to its treatment.

The episodes of oxygen deprivation depend on the asthma's severity; this could explain the reason for which in this study, analyzing asthmatic children with mild intermittent form and mild persistent form, a positive correlation between asthma and dental enamel defects was not found.

This could also explain why the data of this study disagree with those of other authors who found a statistically significant correlation between occurrence of dental enamel defects and asthma in paediatric patients with moderate/severe asthma, especially in those presenting asthmatic symptoms before 3 years of age [Narang et al., 2006; Van Amerongen and Kreulen, 1995].

Group V

The results from the present study showed that dmft mean value in subjects affected by CF was statistically lower ($p<0.001$) than in the control group; this difference wasn't underlined in permanent teeth.

This assessment looks of particularly interesting, since in literature was reported that children with CF had an high frequency of cariogenic food consumption due to ravenous appetites secondary to the presence of pancreatic insufficiency [Aps et al., 2001]. Although the development of dental caries in an individual is a complex process related to a multitude of environmental and hereditary factors, the low caries prevalence in CF patients may be attributed to several factors common to these patients.

It should be considered that all CF patients examined in this study assume constantly supplemental pancreatic enzymes, and are submitted to frequent therapies of antibiotic through aerosols, that could play an important role in the reduction of the plaque levels [Narang et al., 2003].

Furthermore, high levels of calcium and phosphorus have been reported in the sub-maxillary saliva of CF patients [Aps et Martens, 2004]. Incorporation of salivary calcium and phosphate into the enamel surface may be a post-eruptive maturational process which confers to the tooth a greater resistance to demineralization.

However, it must be considered that the mucoviscidosis, manifesting since birth, induces parents to be more careful to the health status of their children, also extending this greater care to the oral cavity. The CF patients have, besides, a better periodontal health, in front of what happens in the same age control.

A meaningful difference has not been found in the presence of calculus among the two groups, only a very low percentage (25.9%) of CF subjects have a dental calculus, confirming what was described in literature [Jagels et al., 1975; Dabrowska et al., 2006].

This data is due, probably, to the assumption of pancreatic enzyme supplementation, which prevents that the elevated concentrations of calcium and phosphate present in CF patients can join with the mucobacterial plaque and to fall in calculus form [Baumhammers et al., 1968; Kinirons, 1983]. It's necessary, however, to consider that the small number of patients, and above all their young age [Kinirons, 1989], influences the low presence of tartar.

The evaluation of DDE has shown an higher incidence of demarcated and diffuse opacities and hypoplastic defects in the CF subject respect to the healthy subjects. It's interesting to underline that this search has not been considering defects of fluoride origin, as the subjects of both groups that have assumed fluoride have been excluded by the study.

It is reasonable to consider that the high incidence of systemic enamel defects (57.4%) may be a result of the metabolic and nutritional disturbance which are often superimposed upon a chronic illness like CF [Azevedo et al., 2006; Sui et al., 2003].

Besides it should not be forgotten that CF patients (since birth) often assume a lot of antibiotics which could influence their dental development.

CONCLUSION

Research is the systematic process for generating new knowledge. Based on the advances in biomedical and social sciences, public health, and information technology, new concepts will lead to innovative interventions that have a direct impact on diagnostic, preventive, therapeutic, ethical and social aspects of human health and disease. In particular, the WHO Oral Health Programme will focus on stimulating oral health research in the developed and the developing world to reduce risk factors and the burden of oral disease, improve oral health systems and the effectiveness of community oral health programmes. In particular, more research should be devoted to inequity in oral health; the psycho-social implications of oral health/illness; diet, nutrition and oral health; oral health - general health - quality of life interrelation-ships. Building and strengthening research capacity is one of the more effective, efficient and sustainable strategies for developing countries to benefit from advances in knowledge, in particular through promotion of regional or inter-country oral health research networks.

This research provides important data about dental and periodontal health status in campanian children. This way, this study established an oral health baseline prior to introducing promotion and prevention strategies and appropriate health care for specific groups, and provided the starting point for monitoring the time evolution according to the World Health Organization 2020 global goals for oral health in Campania region, Italy. Additionally, the results of this study showed particular considerations for each group:

Group I

The goal of WHO nearly exhausted in campanian children; several factors (such as dietary, hygienic and socio economic aspects) are involved in caries process. These results indicate that dental health behaviour is associated with lifestyle as well as demographic factors. All these factors are relevant to a high caries prevalence and demonstrate the importance of a preventive educational programme for children with a comprehensive caries prevention schedule to obtain caries decrease. However, we must rely on the results achieved, but moving forward with new and greater effectiveness methods of prevention.

Group II

The results of this study show that there is an urgent need to strengthen the effectiveness of proven preventive actions in order to prevent the further deterioration of oral health.

Today available preventive systems (fluoride prophylaxis; fluoride toothpastes; control of oral hygiene; reduction of tooth-cariogenic foodstuff; sealing), despite being partly responsible for the reduction of the prevalence disease, haven't succeeded in penetrating effectively this social layers of population. For this reason, the research in tooth decay prevention, in the last few years, is devoting itself to the elaboration of a new strategy able to have a greater applicability and so greater effectiveness. Our findings showed the important relationship among caries experience and socio-economic and cultural family level. New prevention programs must therefore involve the entire family.

Group III

It is important that dentists, as a member of a team for liver transplantation, monitor dental health of patients. Routine dental care and caries prevention programs need to be planned for those children during pre-liver or post-liver transplantation in order to reduce the risk of systemic infection arising from the oral cavity. Oral hygiene instructions to parents should begin as early as possible before liver transplantation.

Group IV

The results of this study show that children affected by mild intermittent and mild persistent asthma, despite its disease status and its pharmacotherapy, do not seem to be more susceptible to caries diseases than children belonging to healthy control group. In addition, this subjects are similar to healthy subjects for periodontal health status and for the presence of dental enamel defects.

For this reason, there is no need of including paediatric patients affected by mild intermittent and mild persistent asthma in particular preventive dental programs.

Group V

This study confirmed that CF patients have a significantly lower caries experience than control subjects; besides, it showed that in CF group there is an higher prevalence of enamel defects and low presence of calculus with a good periodontal health. Developmental defects in the enamel present important clinical significance since they are responsible for aesthetic problems, with subsequent psychological discomfort for the patients. This emphasises the need for a paediatric dentist to be a member of the multi-professional team involved in the care of children with CF with the aim of establishing priority programs of prevention to improve their health-related quality of life.

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