

Methods to Prevent Dental Caries

Cornelia Biclesanu¹, Anna Maria Pangica²

Bucharest, Romania

Summary:

The purpose of this work is to perform a statistical study regarding the frequency of caries in a group of children and make a presentation of the methods used for prevention.

Material and Method. The statistical study which lies at the basis of this work was performed on a randomised group of 120 children from Bucharest with ages between 6 and 13 years of age.

The method included a dental examination with the help of visual-feeler exam by one examiner and data notes in individualized prophylaxis files and by completing a questionnaire in which I wished to find out data on dental exams, patients' attitude towards the health of the dental-maxillary complex, hygiene knowledge, prophylactic fluoridations, and diet habits.

Starting from this data, values of caries indexes were calculated (the frequency index and the index of medium intensity of caries) also taking into account the estimations and recommendations made by the International Health Organization, as well as the achievements of other states affiliated to WHO.

Results and discussions. The analysis of the frequency index showed a medium value of 77%. The DMTF index, in the case of the children included in the study, showed a medium value of 3,33 with variations from 4,83 (6-7 years old), to 4 (8-9 years old), 3,33 (9-10 years old) and 3,36 (13-14 years old). Analysing on groups of ages, the indexes with the highest rates are those in the group of children with ages between 6-7 years, and if we take into account the sex, these indexes are lower for females, sometimes quite considerably.

The method of brushing is scanty and the unhealthy feeding habits are an important factor of risk. It is well known that the best way to fight against a disease is to prevent it, and this is the reason why we propose several efficient methods of prevention (like teeth brushing, control over caries and sealing through healthy diet, etc).

In order to motivate the patients to adopt a diet that helps preventing caries, an individual food journal was suggested, in which the patient recorded the hours and the kind of food consumed during one week. By analyzing this journal together with the patient, a mutual agreement can be reached as to which food represents a danger for the oral health and how its consumption can be restricted in order to reduce caries.

For improving the techniques of brushing, for each patient the index of bacterial plaque was calculated using the O'Leary method and the methyl blue solution 2% as a developer of plaque.

Verification of the sealing method was achieved by observing the group of patients for 18 months.

Conclusions. The main concept of the customized prophylaxis consists in the recognition of patients with increased propensity to caries and in reducing the individual factors of risk through recommending a preventive and efficient treatment.

Key words: dental index, prophylaxis, dental sealants.

¹ D.D.S. PhD, Assistant professor, Department of Restorative Odontotherapy, Faculty of Dentistry, Titu Maiorescu University, Bucharest

² PhD student, Lecturer, Department of Restorative Odontotherapy, Faculty of Dentistry, Titu Maiorescu University, Bucharest

Introduction

The caries remain, together with other cardiovascular and malignant diseases, one of the most commonly found diseases in the present world population, in spite of the development of an entire industry dedicated to products used in the prophylaxis of this disease. At the same time, one can say that the indexes of caries represent a barometer of medical education, being well known that in developed countries these indexes are lower, although the consumption of sugar-likes is higher [1].

Material and method

The study was performed on a randomised group of 120 children from Bucharest with ages between 6-13 years. The study was performed following the 4 stages which lie at the basis of each study: planning, appointment, observation and evaluation.

The planning stage

In this stage, a record of clinical examinations adapted to the requirements of the study and also to the ages of the patients was elaborated. The clinical record includes, together with the dental status, the needs of treatment of each tooth and questions about the social and family situation of the children, their food preferences, diet and the habits of brushing. All these data was registered, codified (dental status and the needs of treatment) and lie at the basis of the statistical examination performed.

The appointment stage

All the dental pathological aspects as well as the needs of treatment were registered in the clinical record. The dental examination was performed on 4 groups of children with ages between 6-7, 8-9, 10-11, 12-13, each group having 15 females and 15 males. Every examination included a discussion about the dental hygiene and dental brushing, and in the end the correct tech-

nique of brushing was presented and the necessity of brushing the teeth at least 2 times a day, in the morning and in the evening was highlighted.

Observation and evaluation stages

The obtained results include an analysis of the frequency indexes, of the medium intensity indexes and of the DMFT indexes, in reference with age and sex.

Results and discussions

The frequency index of caries.

Being calculated as a fraction between the number of children with caries and the total number of examined children, the frequency index doesn't present discordant evolutions in reference to age. But one can notice increased values in the case of children aged between 8 and 9 (77%), as compared to the average frequency index recorded (67%). This increase of the frequency index can be correlated with the presence of mixed dentition at this kind of age, the majority of children presenting carious lesions on lateral temporary teeth, also triggered by the concept of parents who believe that those teeth will change and therefore don't need treatment. At this age, 8-9 years old, some children present carious lesions and most of the times these are incipient caries on the first permanent molars (the permanent first molars) (*fig.1*).

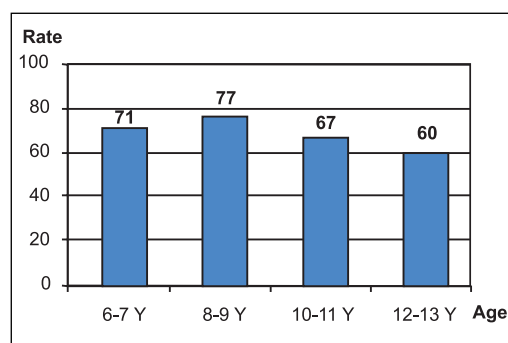


Fig 1. The variation of the caries frequency index according to age

We could also make a correlation between the increase of the frequency index and the early puberty, knowing that the hormones can influence the indexes of caries. This concept did not stand out however, due to the fact that in case of females, where puberty starts earlier, the frequency index is only 58% as compared to the 92% value, recorded in the case of males.

A significant difference between the values of the frequency indexes can be noticed between the group of females of 6-7 years old (34%) and the following age groups: 8-9 years old (26%), 10-11 years old (11%), 12-13 years old (5%) where it progressively decreases (fig. 2).

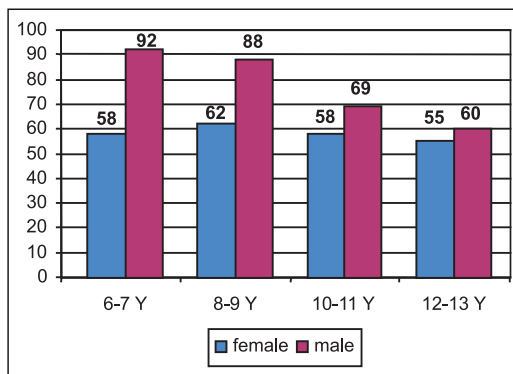


Fig. 2. The variation of the caries frequency index according to sex

The medium intensity caries index

It was calculated as a fraction between the number of teeth with caries and the number of examined teeth. The medium intensity index has an average value of 14% in the group of examined children. An increase in the value of this index can be observed at the group of age 6-7 (3%) and then it decreases significantly registering equal values at the groups of age 8-9 and 10-11. The high value of the medium intensity index of caries in children of 6-7 years old is correlated with the high number of caries on temporary teeth in spite of the low number of teeth on the arch at this age (fig. 3).

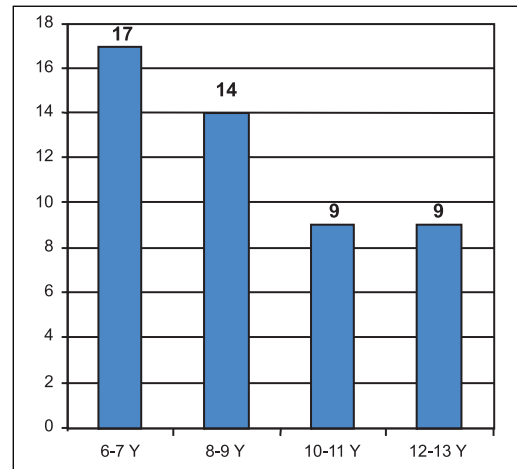


Fig 3. The variation of the caries medium intensity index according to age

In reference to children’s sex, the medium intensity index shows little variations in the case of children of 6-7 years old and 12-13 years old. A significant increase was observed at males of age 10-11(12%) as compared to the females of the same age (5%), in accordance with the variations of the index of caries (fig. 4). In the other age groups, the medium intensity index ranges 3% (6-7y), 4% (8-9y) and 2% (12-13y)

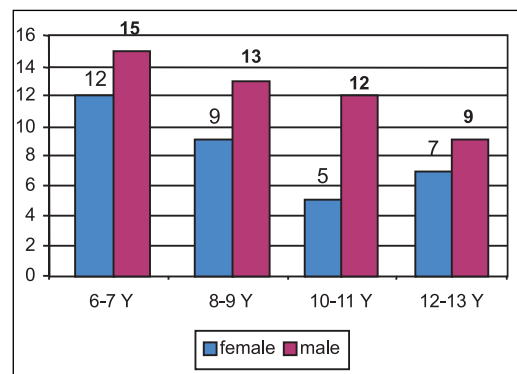


Fig 4. The variation of the caries medium intensity index according to sex and age

The intensity index per inhabitant

Computed as a fraction between the number of children with caries and the number of teeth with caries, the intensity index per inhabitant shows a medium value of 23%

at the group of children, a significant increase being observed at the age of 10-11 like in the case of the frequency index (40%). The smallest value (18%) is in the group aged between 6-7 years (fig.5).

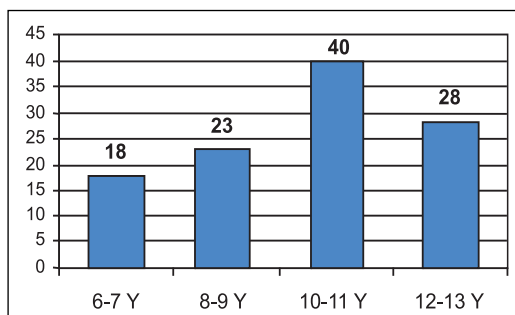


Fig. 5. The variation of the intensity index per inhabitant

The DMFT index

One of the most frequently used indexes of caries, the DMFT index (the number of teeth decayed, missing or filled divided by the number of subjects examined) shows a medium value at the examined children of 3,33. In correlation with age, the highest value is registered at the group of age 6-7 (4, 83). The value decreases at 4 in the group of age 8-9, and in the cases of age 10-11 and 12-13, the values are almost equal 3, 33 and 3,36 respectively.

In the case of age, the males from the first group register the highest value of the DMFT index 5, 4 and in the following groups the values are close enough, 4,13 ; 3,6. It is important to notice that the DMFT index is lower at females than at males and this is the case in all 4 groups; in the group of age 12-13 it declines by almost 50%.

This better result of DMFT index is also correlated with the larger interest shown by females for aesthetical aspects and for dental hygiene.

The following tables display the centralized data regarding variations according to children's sex and age, data that was used to determine the DMFT indexes (table 1, 2, fig. 6, fig. 7).

Table 1. The variation of the DMFT index upon age

Age	DMFT			Total
	D	M	F	
Gr. I - 6-7 y	118	-	27	145
Gr. II - 8-9 y	89	-	31	120
Gr. III - 10-11 y	59	-	41	100
Gr. IV - 12-13 y	74	4	23	101

Table 2. The variation of the DMFT index upon age and sex

Age		DMFT			Total
		D	M	F	
Gr. I	male	71	-	10	81
6-7 y	female	50	-	17	67
Gr. II	male	53	-	9	62
8-9 y	female	31	-	18	49
Gr. III	male	35	-	19	54
10-11 y	female	25	-	23	48
Gr. IV	male	50	3	13	66
12-13 y	female	25	3	11	39

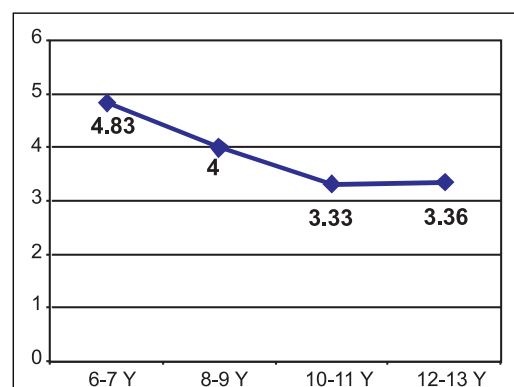


Fig 6. DMFT index age

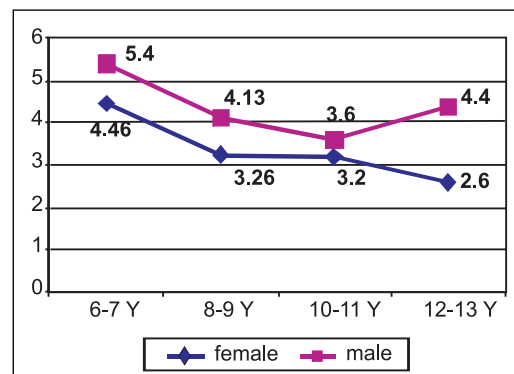


Fig 7. DMFT index age and sex

Feeding habits have a significant place within the causes of dental lesions, the equilibrium between different principles of feeding is an important factor of prophylactic risk [2, 3].

The most important factor of risk has proven to be the frequency and not the quantity of hydro carbonates consumed.

Food containing hydro carbonates is preferred even to fruits, the consumption of which declined constantly. The dairy and meat products are on the second place (fig. 8).

A great difference in the consumption of carbohydrates is observed between men and women, with increasing values in the groups of men starting with ages 6-7 years and up to 12-13 year old, while in the case of women the values decline starting with the group aged between 6-7 years old to the group aged between 12-13 years. Therefore the difference is maxim in the group aged between 12-13 years (59%).

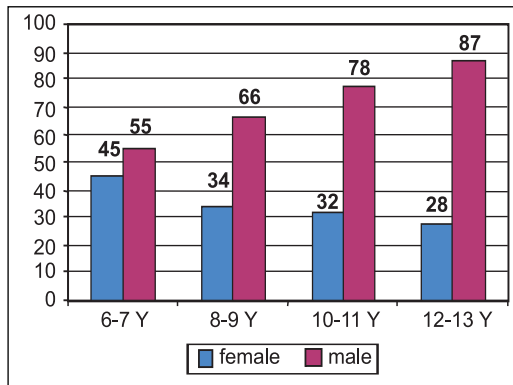


Fig. 8. The consumption of hydro carbonates

The most popular method of dental prophylaxis is unquestionably the dental brushing. This relatively simple technique was proved to be incorrectly applied by the majority of the examined children (fig.9).

The males in the examined group showed an incorrect application of the brushing techniques, higher than in the case of women, and the difference increases from

the groups 6-7 years to the group 12-13 years when it reached the maximum value (65%).

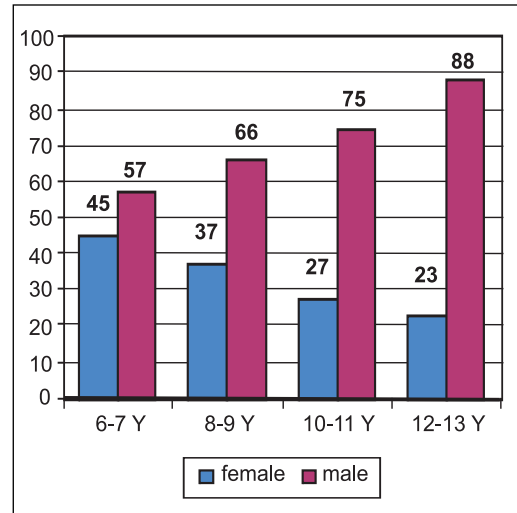


Fig.9. Dental brushing

Although in the school where the present study was performed, media campaigns presenting and promoting the correct brushing technique had taken place and children were made aware of the bacterial plaque, the majority of children did not pay enough attention to the dental hygiene by brushing the teeth after each meal.

For a good instruction regarding dental hygiene the best presentation method consisted in observing the kind of dental brushing applied by each patient. For improving the techniques of brushing, for each patient the index of bacterial plaque was calculated using the O'Leary method and the methyl blue solution 2% as a developer of plaque [4].

Another necessary component for a correct dental brushing is a high quality tooth brush. Due to the great variety of tooth brushes available on the market people have difficulties in choosing a tooth brush [5].

After studying the choices of children regarding the quality of the tooth brush a preference was observed for the nylon tooth brush but as regards the hair on the tooth brush, whether it should be hard or soft,

choices were very different (the majority – 71% prefer soft tooth brushes) (*fig. 10*).

The key for an efficient instruction of the oral hygiene is the recognition of the plaque status and afterwards the necessary tactical exercises can be established.

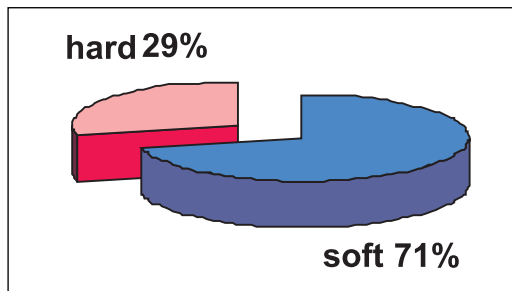


Fig 10. Preferences in choosing the tooth brush, the type of the tooth brush hair

The registration of the plaque index is part of the personal record elaborated by the patient, which can be kept as reference. Thus, the re evaluation of the patients can be achieved during the next meeting.

The sealing of the dental grooves and pits represents an efficient method to prevent the carious lesions at the level of the dental groove and pits on the occlusal sides of the lateral tooth (areas which present high vulnerability, due to the injured surface existing at this level) [6].

A number of 48 sealings were performed on 60 patients from the group of study. These sealings were performed in the case of the first permanent molar and another 12 sealings were performed to the second permanent molar, the difference being represented by the tooth with incipient caries (white spot), filling tooth.

For the sealing, Dyract Seal opaque shade was used, produced by Dentsply, which was applied using the total seal technique indicated by the producer, method which has been achieved following several stages.

The following sequence is usually adopted:

1. The surface to be sealed is cleaned with an oil free paste such as NUPRO® Prophy Paste to move off and to free the dental surface from the bacterial plaque which was present at this level. The surface is afterwards rinsed well with water.

2. Isolating

The teeth to be sealed is isolated with rubber dam or cotton rolls and saliva ejector and each tooth is dried with air, free of oil or water contamination.

3. NRC Non-Rinse Conditioner is applied (1 drop of NRC is applied with an applicator or disposable brush to the fissure, and is left undisturbed for 20 seconds. It is not rinsed afterwards, the excess of NRC is removed by blowing gently with an air syringe).

4. Prime&Bond NT is applied (1 drop of Prime&Bond NT is applied to the fissure, left undisturbed for 20 seconds, solvent is removed by blowing gently with air from a dental syringe for at least 5 seconds). Immediately afterwards, Dyract Seal is applied.

5. Application of Dyract Seal Pit and Fissure Sealant (the cap from the end of the syringe is removed to assure free flow of material from syringe, a small amount is expressed onto pad; disposable needle tip is attached to the end of the syringe; Dyract Seal should flow freely with gentle pressure; Dyract Seal is dispensed directly into the fissure).

6. Curing

A cure of at least 20 seconds with a dental polymerisation unit follows (e. g. Spectrum™, ProLite™) keeping the tip of the light guide as near as possible to the tooth without touching it.

Soft (oxygen-inhibited) surface layer is removed after light-curing with cotton pellets or cotton rolls .

Retention and occlusion control

Verifications are made using an explorer in order to have complete coverage and

retention. Also by using an articulating paper or if necessary, with a finishing bur, it should be checked whether premature occlusal contacts are correct.

Results and discussions

The analysis of the frequency index showed an average value of 77%, a higher value was reported to the patients with ages between 6-7, 8-9, 10-11 and 12-13. A predilection for caries exists especially at the temporal tooth level, but also at the first permanent molars level, because most of the times these teeth are confused with temporary teeth.

Deep dental grooves and fissures were observed even in the case of the children with first permanent molars, so the sealing was necessary even in this case. The DMFT index of the analyzed children showed a medium value of 3,33 with variations between 4,83 (6-7 years old) and 4 (8-9 years old), 3,33(9-10 years old) and 3,36 (13-14 years old). The WHO desideratum, that of maintaining the MDFT index at a maximal value of 3 in the case of 12 year old children, is not accomplished in this case, but in our country a significant improvement of these indexes was registered as compared to the values registered during the past 20 years [7].

Analysing on groups of age, the indexes with the highest rates are observed at the group of age 6-7, and taking into account the sex of the children, they are lower at females, sometimes quite significantly. No scientific explanation for this fact was found and most likely this difference was caused by the higher interest for the aesthetical aspect shown by females.

It is interesting that in the study performed in this school, the number of dental problems is correlated with the family situation. Children whose parents have university degrees have a perfect oral-dental situation or, in any case, a better oral situation than

children whose parents have only high-school degrees.

The difference consists in the sanitary education but also in the interest about the oral-dental hygiene. It must also be noticed that all children had access to sanitary education through the campaigns for dental prophylaxis products. Thus the technique of brushing applied by children was incorrect and the suggested frequency of dental brushing was not respected, the proof being the presence of bacterial plaque at the tooth level.

Another important aspect for the dental-oral health is represented by the feeding habits, which are based mostly on the consumption of fermentable hydro carbonates and less on the consumption of proteins and vitamins, fact also correlated with the social situation of the family, generally a modest one.

The needs of treatment of these children are exactly as expected, in correlation with the obtained indexes values. The treated cases, presented at the end of the study, show that a very good oral-dental health can be obtained using the prophylaxis and the treatment methods.

Each sealing has been evaluated in reference to the 4 parameters checked first after 1 month, then after 6 months and after 12 months and the followings were concluded :

- no superficial irregularities existed;
- the marginal adaptation was incorporated and corrected irrespective of the sealing material used.
- there was no appearance of caries lesions observed at the level of the sealed dental surface during the entire period of time.
- the sealing was totally present.

At the end of the study, from a sum of 20 sealings applied with Dyract Seal material using the Total Seal technique, none of them showed material lack at the occlusal area level where it was applied, proving a very good retention and having as a result a

high efficiency in preventing caries lesions at this level [8].

At the end of the study, at the level of the sealed tooth, there was no appearance of any caries lesions, the sealing agent proving its efficiency in preventing the caries lesions with a percentage of 100% [9].

The sealing method is the most efficient method of preventing caries at the level of dental grooves and pits.

The dental sealers are the only materials able to efficiently prevent on a long term basis the appearance of caries lesions at the level of the dental groove and pits occlusal sides, through the mechanical barrier that

they form at this level. The feeding and the oral hygiene also have an important role in preventing the caries.

Conclusions

In order to obtain good results, health programs at national level have to be followed from the early ages, but also a perfect coordination between the doctor and the prophylaxis assistance must be attained. School of dentistry office has to observe, treat and sanitary educate children from the first contact with school.

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Correspondence to: Dr. Cornelia Biclesanu, Department of Restorative Odontotherapy, Faculty of Dentistry, "Titu Maiorescu" University, Gh. Petrescu Street, nr. 67A, sector 3, Cod 031593, Bucharest, Romania. E-mail: corneliabicle@yahoo.com