

KRZYSZTOF WŁOCH, PIOTR KSIĄŻEK, ANNA KRAJEWSKA, DOROTA ROLIŃSKA

## Organization of dental care – caries prophylaxis in children and teenagers in Poland

### Abstract

Dental caries in children and teenagers is a social problem and an important element in public health. It stems from its high prevalence and the consequences of not implementing proper treatment are serious. Younger and younger children suffer from dental caries. When it is not treated, the consequences tend to be serious and costly. Pathogenesis of dental caries, methods of treatment and its prevention have been described based on available literature.

The decline in frequency of its appearance will be beneficial for both the sick and society. It will be possible thanks to an early introduction of caries prophylaxis. What is more, a change of mindset and lifestyle is highly recommended as well, not to mention the fact that full and easy access to dental care seems to be essential. All of the factors mentioned above are strictly connected with the proper organization of dental care providing special treatment for children and teenagers in Poland. Its scale should be wide and should cover such activities like teaching to brush one's teeth properly, access to fluoridation or treatment provided in public dental surgeries located, for example, on school grounds. Current organization of dental care is dealing better and better with the issue concerned, however, to minimize the risk of caries in children further changes should be introduced.

**Keywords:** caries, dental health, children, teenagers, prophylaxis.

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### INTRODUCTION

Dental caries in children and teenagers is a social problem and an important element in public health. It stems from its high prevalence and the consequences of not implementing proper treatment are serious. Dental caries is primarily conditioned by individual health behavior patterns and system factors, which influence functioning of dental care health programmes. It seems that only caries prophylaxis and proper organization of dental care (mainly concerning easy access to it) can have a beneficial effect on general dental health state in children and teenager. On the other hand, the health of the oral cavity will have an impact on young patients' well-being as well as on their general physical and mental health state, which is why it is of vital importance not to neglect the issue concerned.

### AIM

The aim of the study is the analysis of the organization of dental care in Poland regarding children and teenagers with particular reference to dental prophylaxis.

Caries is an infectious disease concerning hard tissues of the tooth. It is present in the majority of society [1]. The essence of pathological process is local decalcification and decay of hard tissues of the tooth [2]. Caries process is initiated by streptococcus (*Streptococcus mutans*) and subsequently by lactic acid bacillus (*Lactobacillus acidophilus*). They metabolize

sugar inter- and extracellularly, producing acids which decalcify tooth enamel and get inside the tooth into dentine [3].

The reasons for dental caries are diverse, however, it seems to be mainly conditioned by factors like:

- Susceptibility of dental tissues to the reaction of ecosystem in oral cavity;
- The buildup of dental deposits on teeth and gums;
- Food rotation between teeth;
- The presence of bacterial flora in dental plaque;
- Dental crowding;
- Insufficient oral cavity hygiene [3].

Interaction of some factors is also crucial in the process of the disease, for example:

- Frequent consumption of carbohydrates;
- Buffering quality, quantity and ability of saliva;
- Chemical, histopathological, and anatomical structure of hard tissues of the tooth [1].

Moreover, both oral health status and tooth caries in particular depend on individual health behaviors and that is why it seems to be of vital importance to introduce prophylaxis as early as possible. Untreated dental caries accounts for permanent tooth loss in children. It causes a major problem, especially when it concerns school children. In Poland the percentage of children at the age of 12 who are said to lack at least one tooth due to caries equals 7.2% [4]. The data are deeply disturbing.

Epidemiological data obtained from studies conducted within the framework of 'Monitoring of Oral Health' programme in Łódź between the years 2010 and 2012 indicate the following frequency of cavities:

- In deciduous teeth
  - At the age of 3-57% (attendance) and 2.7 teeth with cavities on average;
  - At the age of 5-79.9% and 5.07 teeth;
- In permanent teeth
  - At the age of 12-79.6% (attendance) and 3.5 teeth with cavities on average;
  - At the age of 15-91.8% and 6.12 teeth;
  - At the age of 18-96.1% and 7.95 teeth;
  - Between 35 and 44-99.9% and 16.91 teeth;
  - 43.9% of people aged between 65-74 are toothless [4].

To prevent oneself from the consequences of dental caries, prophylaxis understood in a broad sense should be considered, based on four fundamental rules which include:

- Following oral hygiene procedures;
- Rational diet, including a fight against malnutrition and obesity;
- Complementation of lacking fluorine compounds using endogenous and exogenous methods;
- Advisory service and preventive treatments [2].

In the field of oral hygiene it is essential to brush one's teeth regularly using a properly chosen toothbrush, toothpaste, dental floss, an interdental brush and mouthwash. It is also vital to use a proper brushing technique (Fones brushing technique, circular brushing technique, Bass technique) and clean the back of the tongue. Learning to brush one's teeth properly is one of the most fundamental elements concerning caries prophylaxis. Parents usually teach their children to use the same brushing technique which is based on their experience. However, it might be a mistake as their technique is not necessarily the correct one. As a result, their children might form bad habits. That is why, it seems to be most sensible to confront one's knowledge with dental guidelines or allow the dentist to provide information concerning oral health.

On the other hand, caries prophylaxis regarding diet assumes consuming products rich in nutrients essential for teeth to grow new tissues such as protein, calcium, phosphorous, iron and vitamins A, C and D. Moreover, excessive consumption of sweets should be avoided, especially between meals and just before going to bed. According to the World Health Organization, consumption of free sugars should equal maximum 5-10% of daily intake of calories. Sour products and fizzy beverages are also to be avoided. Fruit juices which contain a lot of sugar should be reduced. The most recommended beverage is water and also milk because of pH. It is advised to consume cleansing foods, which remove soft plaque from the surface of the tooth. Apples, carrots, nuts or hard cheese possess such qualities. When it comes to children, developing proper eating habits seems to be essential in order to prevent additional risks of dental caries.

Another element of prevention of dental caries is through the use of fluoride, which should be adjusted to the level of fluoride in the environment, patient's age, and his/her state of teeth. It involves different forms such as water fluoridation, fluoride tablets and contact fluoridation. To some extent (fluoride tablets, using fluoride toothpaste) it can be done in the

home environment, however, it appears to be essential to provide the patient with proper education beforehand. Whereas the form of fluoride prophylaxis available only at the dental practice is dental varnish with the use of adequate amount of fluoride [5].

Nonetheless, the most important role is assigned to professional prophylaxis which is done directly at the dental practice. The doctor's task is to evaluate patient's oral hygiene and also give him/her guidelines concerning how to take proper care of their teeth. It seems to be particularly crucial when it comes to children, who absorb knowledge in all fields and form habits for years.

In order to maintain oral hygiene on the highest level in children, it is essential to make an appointment with the dentist when the child is around six. At that time permanent teeth grow – incisors and accessional teeth. They are particularly prone to caries due to their anatomical structure – deep grooves where plaque and cariogenic bacteria are gathered. The best prophylactic solution which helps to prevent caries is dental sealants. What is more, doctor's tasks at the dental practice include dental caries treatment, professional dental cleaning and decaling, and contact fluoridation [6].

Dental caries is most often discovered using a visual method. The doctor examines the surface of patient's teeth for stains or advanced cavities. Early identification of such irregularities enables to take proper measures which, in turn, will reverse the ongoing pathological process and consequently lead to remineralisation of enamel. If there is a cavity, it needs to be filled [2]. Carious lesion, therefore, is mainly caused by the fact that people do not go to the dentist at all or on regular basis. In children's case, it often happens that a dental appointment is made when pain is involved, that is why parents are advised to observe and control their children's teeth. However, the best solution seems to be regular dental check-ups, thanks to which it is possible to observe early irregularities and prevent caries as a consequence.

In Poland patients are entitled to choose any dental practice or doctor that provide benefits based on the agreement with Polish National Health Fund (NFZ) all over the country. A referral is not needed to make an appointment with the dentist. NFZ refunds certain dental treatments for children and teenagers under 18. Such treatments include:

- Fluoridation of temporary teeth (at the age of 6, 9 and 12 years) and permanent teeth (at the age of 2, 4, 5, 6, 7, 10, 12, 13, 16 and 19 years, a quarter of the dental arch once every 3 months);
- Sealants of molar teeth (first molar teeth once by the time the child is 7);
- Fissure sealing of temporary teeth with caries;
- Filling cavities with chemical-cured and light-cured materials (in case of children with enamel hypoplasia and broken teeth);
- Putting on healing dressings with zinc oxide;
- Tooth extraction under anaesthesia;
- Endodontic treatment of permanent teeth;
- Putting on a removable dental brace in children aged under 12 and doing a pantomogram in connection with it;
- Check-ups during orthodontic treatment for children under 12;
- Handling orthodontic brace repairs resulting from misuse (once for children under 13) [7].

Costs of other dental treatments must be paid by parents or legal guardians themselves. Unfortunately, the Polish health care system reduces the number and scope of dental treatments available for young patients guaranteed by the act on healthcare benefits financed from public funds. It is of a great importance for people in financial need, who must reduce such expenses, which in turn, has consequences regarding their children's health. Moreover, an additional factor influencing increase in dental caries in minors is elimination of dental surgeries in educational establishments. They were an easily accessible form of caries treatment and prophylaxis for schoolchildren. Permanent control and constant touch with the patients enabled the doctor to detect possible cavities and apply proper treatment rapidly. Additionally, parents did not need to pay for the treatment or make an appointment with the dentist. At the school dental surgery there were better conditions to conduct classes concerning caries prophylaxes than in external surgeries where a tight schedule often do not allow to educate the patient efficiently.

Another issue worth mentioning is a common misconception prevailing in society that temporary teeth do not require treatment. The consequence of not treating caries in temporary teeth might be damage to permanent teeth buds. Moreover, children depend on parents' action, who do not always treat the issue concerning oral hygiene seriously enough. When the problem in this field is ignored, frequently teeth cannot be treated and have to be extracted. Moreover, parents do not monitor the way their children brush their teeth or they pass inadequate knowledge concerning the issue, which stems from the fact they do not do it correctly themselves. Furthermore, some adults dread going to the dentist and their fear is passed to their offspring who, in turn, starts to be afraid of a dental appointment [4].

Such opinions and a wrong approach towards caries prophylaxis resulted in an increase in cases of dental caries in children and teenagers in Poland, which in turn influenced the government to introduce a recovery programme connected with the issue concerned. In connection with this, Council of Ministers undertook National Health Programme for 2007-2015. One of its operating goals was 'Intensified prevention of caries in children and teenagers', which targeted following things:

- The increase (of 10-20%) in the number of children being educated about health promotion;
- Stop of the increase in appearance and reduce of the severity of dental caries;
- Reducing the frequency of gingivitis, periodontal disease, injuries and pathologies of masticatory apparatus [8].

On the other hand, such targets could be met through implementation of the following actions:

- "introduction or intensification of health education concerning oral cavity;
- popularization of brushing children's teeth in kindergartens;
- intensification of group fluoride prophylaxis for I-IV grade pupils;
- intensification of professional group fluoride prophylaxis for high risk caries groups in children and teenagers (by Doctors of Medical Dentistry);
- implementation of multiannual health policy programme of the Minister of Health (Oral health improvement programme for children and teenagers, improving children and teenager's access to dental care)" [8].

Realization of such actions will enable to increase control over children and teenager's state of teeth, nevertheless, it requires certain reorganization of current dental care. One of the changes introduced in the programme is restoring school dental surgeries to public schools in compliance with the act passed in September in 2017. New government regulations enable to obtain subsidies needed to open school dental surgeries, which will serve a prophylactic function as well. The act provides that there will be more money spent on equipment and medical apparatus in health care entities and school dental surgeries serving a prophylactic function [9].

Yet another solution for children attending really small schools, where opening dental surgeries is not a possibility, is an introduction of so called 'dental buses'. They are mobile dental practices well-equipped with modern apparatus essential for caries prophylaxis and its treatment. In December 2017, 16 dental buses were purchased to treat children's teeth [10].

Numerous educational programmes are an effective means to fight for oral health improvement. Thanks to them, there is a possibility to pass on adequate knowledge concerning proper oral hygiene or eliminate wrong habits related to brushing one's teeth. It seems to be of a vital importance especially for young patients who will have healthy teeth for a long time. Examples of such programmes are 'Childhood without caries' or 'Aquafresh academy' [11].

Between the years 2013 and 2015 the programme 'Protect children's smile' was realized, whose aim was to form good habits concerning proper oral hygiene. It assumed that special classes were conducted in primary schools, during which the participants got not only proper information but also informative materials. Thanks to this additional form of diversity, the pupils were more enthusiastic, which increased the chances of developing further interest in the issue concerned. Additionally, children participating in the programme had dental check-ups in mobile dental surgeries [12].

Nowadays, the issue of oral hygiene is a common topic in a number of TV programmes or cartoons for children, which makes it more possible to get the message across to a large number of young patients. Simultaneously, there seem to be many campaigns promoting healthy eating habits and reduction of sugar intake. Such intensive activities have a great influence on children, what in turn enables them to develop good eating and oral hygiene habits.

## CONCLUSIONS

In Poland there are more and more large-scale activities concerning caries prophylaxis. They involve diverse fields and forms of activity. Prophylaxis, understood in this way, means both education to brush one's teeth properly and a broad range of available dental services and procedures for young patients refunded by NFZ. Restoring school dental surgeries seems to be its great complementation. It appears that solely this kind of complex caries prophylaxis could have a considerable effect on the improvement in dental and oral health in Polish children. Parents' participation plays an important role in the process too. They should be fully engaged in the fight for their children's oral and dental health.

However, it will be possible to assess the effectiveness of the activities concerning caries prophylaxis in children in Poland in several years. It should be hoped that all of the introduced

changes regarding organization of dental care in children and teenagers will prove their worth and children's oral health will benefit from them.

#### Corresponding author

Dr Krzysztof Włoch  
Chair and Department of Public Health,  
Medical University of Lublin  
1 Chodźki St., 20-093 Lublin  
E-mail: krzysztof.wloch@umlub.pl

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