

Oral diseases prevention at an early age

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Oral health is the state of healthy and properly functioning dental and other oral structures, with the absence of dental fear and anxiety. Pediatric Dentistry includes all aspects of dental care for children and adolescents. Starting the prevention in the early childhood enables preservation of healthy erupting teeth and the health of other oral structures. Pediatric Dentistry also includes an early diagnosis and the treatment of a multitude of oral diseases, mineralization disorders, developmental disorders and teeth eruption and traumatic injuries in healthy children, as well as ill children and children with disabilities (1).

For most children, a visit to the dentist means a stressful situation. That is expected, given that a visit to the dentist includes facing several potentially stressful factors/situations, such as unpleasant and unfamiliar sounds and tastes, facing unknown staff and authorities, uneasiness and even pain. Therefore, uncooperative behavior and fear are common reactions in everyday dental practice (2). Thorough anamnesis and clinical checkup of the child should take place in the following order: establishing a good connection with the patient and their parents, deciding on ordering the X-ray images and laboratory tests, recognizing possible indicators of the general health condition and possible illnesses, as well

as making an accurate diagnosis, and based on that make an appropriate treatment plan (3).

Oral hygiene

corresponding oral hygiene can be achieved and maintained by mechanical and chemical means at home and in a dental clinic (Table 1.) (4).

Tooth brushing is of particular importance when it comes to the preservation of periodontal health, and research (5, 6) show the connection between not brushing and the development of gingivitis and early caries in infants. It is of utmost importance that the parents know how to start tooth cleansing/brushing immediately after the eruption of the first tooth so as to establish a proper regimen of brushing as soon as first primary molars start erupting. The parents should be introduced to the proper technique and they should be taught how to use it. As children are not able to conduct effective oral hygiene by themselves, parents must brush their teeth at least until their sixth year, and after that they should supervise the procedure on a regular basis. Soft toothbrush of the fitting size and fluoride toothpaste are the most effective means of maintaining oral hygiene in primary and mixed dentition. If needed, the usage of dental plaque identification test should be recommen-

ded. Electric toothbrush has the same cleaning effect as a hand toothbrush and thus it can be a motivating means of brushing for some children and great help for patients with disabilities. Dental floss and toothpicks may be used only in a permanent dentition emerged completely. General recommendations for everyday care at home include: brushing teeth twice a day – after breakfast and before going to sleep, choosing a toothbrush that has a small head and a long handle, and the usage of fluoride toothpaste in small amounts (4).

Oral hygiene should be conducted at least twice a day, so that children do not consume anything except water after having brushed their teeth in the evening. It is recommended that smaller children use the horizontal technique of brushing, which will be used by the parents while brushing teeth of their preschool children. Later, when the child acquires manual skills, they may start using the Fones method or the vertical technique of brushing. After having gained some confidence, the child may use other techniques as well, and the one recommended is the Bass technique. A certain amount of time should pass since the last meal (especially the one rich with acids) so that the enamel is remineralized by the saliva minerals or brushing will otherwise scrub the demineralized

Table 1. (adapted from (4))

| | MECHANICAL PROCEDURES | CHEMICAL PROCEDURES |
|----------------|---|--|
| AT HOME | conventional tooth brushing electric tooth brush dental floss toothpick interdental brushes | antimicrobial solution antiseptic toothpaste |
| PROFESSIONALLY | rotary instruments scrapers | antibacterial gel antibacterial paints antibiotics |

enamel and cause the erosion of the tooth enamel. The recommended time is between 30 and 60 minutes after the meal (7).

Sucking on pacifiers and sucking on fingers are highly ranked on the list of etiological factors for the development of malocclusions in primary dentition (8). A rear crossbite might appear in children who suck on pacifiers, as well as central line deviation and mandibular lateral displacement, anterior openbite, and with finger sucking asymmetric single-sided open bite and overjet may ensue (9).

Recommendations from the aspect of eating habits

Cavity is a localized disease caused by the unimpeded accumulation of natural oral bacteria. Anaerobic bacteria within the cariogenic biofilm create, as an integral part of their metabolism, acids that affect the tooth enamel (10).

General recommendations considering diet and eating habits for avoiding caries are very simple:

- limiting the frequency of meals to 5-6 a day,
- trying to avoid drinks and foods that contain sugar,
- restricting the consumption of sweets and sweet food to once a week (e.g. Saturday's sweets),
- if the intake of sweets and chewing gums is not possible to avoid, then food sweeteners should be used (e.g. xylitol or sorbitol),
- advice for infant nutrition so that early cavity could be avoided in children (early childhood caries -ECC)
- the reduction of frequent in-

takes of acidic beverages, such as non-alcoholic drinks, fruit juices and sport drinks (4).

The use of antiseptics in prevention of oral diseases

Among the antimicrobial substances that can be found in products for maintaining oral hygiene, chlorhexidine is the gold standard. It has a strong affinity towards oral structures and it mediates between static transport and the metabolic path of the susceptible bacteria. Chlorhexidine has a general effect on the gram-positive microorganisms as well as on a group of *Streptococcus mutans*, which are partially susceptible. Within a few weeks or months after the chlorhexidine treatment, a normal growth of *Streptococcus mutans* comes into effect. The synergetic activity of chlorhexidine and fluorine has been proven in clinical research (11), extending reduction time of *Streptococcus mutans* in relation with chlorhexidine itself. Lactobacilli are less susceptible and a vast number of bacteria have not been affected by the activity of chlorhexidine. The medicine has low toxicity levels and a small number of side effects which are, other than tooth discoloration, very rare. A relatively bitter taste is unwanted with children. After rinsing with a 0.2% dilution of chlorhexidine, the quantity of bacteria in plaque and saliva deteriorates for about 80% (12).

James et al. have made a review of the existing literature about the use of antiseptics (chlorhexidine) with gingivitis and periodontitis, and to that end they have included 5345 respondents in 51 research assignments. They said there is clear proof that by rinsing and brushing teeth with chlorhexidine dental plaque

diminishes significantly after 4-6 weeks and 6 months and that there is no difference depending on the concentration of chlorhexidine. Nevertheless, they emphasize that rinsing mouth with chlorhexidine during the period of 4 weeks or more may lead to teeth discoloration, dental calculus forming, transient taste changes, and an unwanted effect on the oral cavity mucosa (13).

The usage of fluorine in prevention of oral diseases

Fluoride usage has an impact on the tooth in development, by forming larger and more stable enamel crystals; it hinders the emergence of bacterial plaque by blocking the enolase enzyme during the glycolysis process; when it is used in the form of dilution, it prevents the process of demineralization, it enhances the process of remineralization by forming crystals of fluoroapatite when it is used in the form of dilution; and it affects the morphology of the tooth crown, therefore creating shallow pits and fissures that are not prone to plaque retention (14).

Fissure sealants as means of prevention of cavity emergence

Fissure sealants is a treatment which is used for sealing the teeth fissure or pits with a material that is retained on the surface of the enamel by using the technique of acid etching or through chemical bonds of the material on the surface of the enamel, as is the case with the sealants materials that are based on glass-ionomers. The most frequently used material for that purpose is the sealant mass based on resin, out of which some are light-curing and some are chemically curing (4). According to the

Table 2. EAPD guidelines for the use of fluoridated toothpastes in children (15)

| THE AGE OF THE CHILD | FLUORIDE CONCENTRACION | FREQUENCY | THE AMOUNT USED |
|----------------------|------------------------|-------------|-----------------|
| 6 months - 2 years | 500 ppm | Twice a day | Pea grain size |
| 2 years - 6 years | 1000 (+) ppm | Twice a day | Pea grain size |
| 6 years and older | 1450 ppm | Twice a day | 1 – 2 cm |



Figure 1. Common oral condition of oral health in children (Professor Hrvoje Jurić, DMD, MSc, PhD).



Figure 2. A permanent molar damaged by caries as a consequence of bad oral hygiene and the absence of tooth sealant



Figure 3. Sealants on permanent teeth (Professor Hrvoje Jurić, DMD, MSc, PhD).

research, a complete preservation of the sealant decreases from 92% in the first year of installment to 66% after seven years, and that is for sealant mass based on resin (16). Most of the research that compares the durability of the sealants made of the materials based on resin and glass-ionomer materials for sealants purposes discovers a weaker retention of the glass ionomers. Numerous research on the effectiveness of the sealants on primary teeth point to the limitations of this procedure in those cases, even though it seems that good results may be expected if satisfactory dryness of the working field is ensured (17). Sealing surfaces with indicators of early cavity will undoubtedly result in small cavity lesion sealant, and even those with histological dentin cavity. Still, studies have shown that the amount of bacteria deteriorates and that the progression of the dentin lesion is diminished after fissure sealant (4).

The procedure of fissure sealant is conducted in the following stages:

Tooth surface preparation: different procedures of fissure cleansing are

sufficient and there is no need for routine preparations of the enamel before applying the sealant, except if the clinician suspects on dentine cavity (18, 19),

Tooth isolation: the most important factor in good tooth retention is moisture control, made by cotton rolls or rubber dam, in the case of tooth contamination with saliva, the tooth should be washed, dried and etched once more (20)

Etching: mostly made of 37% orthophosphoric acid, it has been proven that the time of etching is not as important as good isolation (21)

Rinsing and drying: it is rinsed with water spray for 30 seconds and afterwards it is dried with non-contaminated compressed air for 15 seconds, even though the exact time is not as important as it is important to do it long and thorough enough in order to remove the acid from the surface of the teeth for etching purposes and so that the surface of the

teeth has a common "chalky" appearance (20)

Applying the sealant: avoid overfilling the fissure and avoid applying the sealant beyond the line of etching on the occlusal surface (22).

The most important recommendations of the american academy of pediatric dentistry (aapd)

MALNUTRITION AND CARRIES: Children with cavity in early childhood (ECC) might be severely malnourished due to the connection between pain and disinclination of nurture. Nutritional deficiencies during childhood may affect cognitive development (23).

CONNECTION TO OTHER DISEASES: Gingivitis is equally present with children and adolescents and children might also develop some forms of periodontitis (24). The connection between periodontitis and cardiovascular diseases has been proven as well (25, 26), as well as between periodontitis and adverse pregnancy outcomes (27, 28). Also, there is a link between oral and respiratory diseases (29, 30).

FLUORIDES: AAPD encourages the usage of fluorides in the provision of drinking water on optimal levels where

Table 3. The possibility of fluoride application (4)

| SYSTEMATICALLY | TOPICALLY |
|----------------|-------------------|
| Drinking water | Toothpaste |
| Salt | Mouthwash |
| Milk | Coating solutions |
| Tablets | Varnishes |
| Drops | Gels |
| | Suckable tablets |
| | Chewing gum |

Tablica 4. Pieces of advice for fluoride use in different clinical situations (14)

| CLINICAL SITUATION | INTENDED PROCESS |
|---------------------------------------|--|
| Caries in 0-6 years of age | Fluoridated toothpaste (1 000 ppm F) Fluoride supplements (0,5 mg a day) Fluoride varnish every 6 months |
| Caries in 6+ years of age | Fluoridated toothpaste (1 000 ppm F) Fluoride supplements (0,5 mg a day) APF gels or fluoride varnish every 6 months Use of fluoride gels or liquids for everyday rinsing at home |
| Aggressive caries in 0-6 years of age | Fluoridated toothpaste (1 000 ppm F) Fluoride supplements (0,5 mg a day) Fluoride varnish every 3 months |
| Aggressive caries in 6+ years of age | Fluoridated toothpaste (1 000 ppm F) Fluoride supplements (0,5 mg a day) APF gels or fluoride varnish every 3 months Use of fluoride gels or liquids for everyday rinsing at home |
| No caries in 0-6 years of age | Toothpaste with a low fluoride concentration (up to 550 ppm F) Use of fluoride gels or liquids for everyday rinsing at home |
| No caries in 6+ years of age | Fluoridated toothpaste (1 000 ppm F) Use of fluoride gels or liquids for everyday rinsing at home |
| Orthodontic cases | Fluoridated toothpaste Fluoridated liquid for everyday rinsing |
| Erosion of caries | Fluoridated toothpaste Fluoridated varnish Fluoridated liquid for everyday rinsing |

possible. It grants the supplement of the child's nutrition with fluorides according to the established guidelines when the levels of fluoride in tap water are insufficient or non-existent. It acknowledges that drinking fluoridated water and brushing with fluoride toothpaste twice a day is the most effective method of the reduction of cavity frequency in young children (31). There is evidence that the use of fluoride for the prevention of cavity is safe and highly effective in the reduction of prevalence of dental cavity. Children that drink water with a shortage of fluoride levels (less than 0,6 ppm) are considered to be children in risk of developing cavity. It has been proven that professionally applied surface products as 5% NaFV or 1.23% F in the form of gels are effective with cavity reduction in children with risks. Children younger than three years of age should take fluoride toothpaste of rice grain size, and children between 3 and


6 years of age of pea grain size. It has been proven that the use of 38% SDF (silver diamine fluoride) is effective for the prevention of cavity caries lesions in primary teeth (32).

ARTIFICIAL SWEETENERS: AAPD supports the use of artificial sweeteners such as Xylitol when possible (33).

TEMPORARY FILLINGS: AAPD endorses the use of temporary fillings in the field of restorative pediatric dentistry. Temporary fillings are recommended to young patients, non-cooperative patients, patients with special needs, and to patients that cannot have a permanent filling. Temporary fillings can be used as a means of cavity control in young children with numerous cavities before permanent restoration (34).

THE PREVENTION OF EARLY CHILD CAVITY: Avoid frequent food and drinks consumption that contain sugar. Start with oral hygiene with

the eruption of the first primary tooth. With children that have an increased risk of early child cavity use fluoride varnishes professionally. Cooperate with parents and advise them about preventive procedures (35).

NUTRITION: Propose to national and international organizations to lower the intake of sugar to less than 10% of the overall energy intake so as to lower the risk of the increase of body weight and cavity in children. Children aged between 4 and 8 years should minimize the intake of sugar to 5% of the overall energy intake. Children should be breastfed until the 12th month of life in order to secure the best possible health, developmental and psychosocial results. AAPD proposes natural fruit juices for infants, children and adolescents (36). 

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