

Toothpastes and Recommendations for their Application - Overview

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Abstract

Background: Daily regular brushing of teeth twice daily with fluoridated toothpaste is widely recommended for school-aged children. **Methodology:** The article analyzes available pharmacy products for children by age and shows trends in the development of basic principles and some World Literature recommendations for their application in Bulgaria. The overview shows 28 different toothpastes as pharmaceutical products either with or without fluoride in English and Bulgarian language between 2014 and 2018. The used literature aims to guarantee a balance between maximizing the protective effect towards tooth caries and minimizing the risk of developing fluorosis. **Results:** Clinicians need to establish a balance between their practical experience and the preference of their patients. The daily use of fluoride toothpaste in combination with instructions for oral hygiene is the main part of caries prevention. **Conclusion:** It has to be used in addition to other prophylactic means, such as healthy nutrition and exogenous fluoride application.

Keywords: Toothpastes, Fluoride concentration, Paste composition

1. Introduction

Paolo Melo, Charlotte Fine and co-authors, 2018, conduct a study in 10 countries with 7 991 children between 2-12 years of age for 6-12 months. Final results concerning 5 148 students have been evaluated. Analysis show that 25% more students brush their teeth twice daily. The program they incorporated was most effective with children between 7-9 years. After the training, conducted by the authors, it was established that there is an increase in the frequency of brushing among children. The result was continuous, even after 6-12 months. The introduced program illustrates steady means of improving children's knowledge and attitude concerning their oral health. The point of this study is to collect the needed information for the available toothpastes for children in the pharmacies and to improve the knowledge of doctors for their prescription (Melo, P. & Fine, Ch. & Malone, S. & Jo, E. (2018).

1.1. Fluoride toothpastes.

Clinical effect the widely used fluoride toothpastes are one of the main reasons for the decrease of the need of caries treatment, registered in the last 30 years. Brushing the teeth with fluoride toothpaste is an ideal method for public health, which is convenient, non-expensive and approved, as well as widely spread (Burt, 1998). The usage of fluoride toothpaste among children and teen ages was subjected to some examinations during the last 10 years (Marinho et al. 2003; Twetman et al. 2003; Ammari et al. 2003, Marinho 2008).

2. Methods

The article analyzes available pharmacy products for children by age and shows trends in the development of basic principles and some World Literature recommendations for their application in Bulgaria.

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The overview shows 28 different toothpastes as pharmaceutical products either with or without fluoride in English and Bulgarian language between 2014 and 2018. The used literature aims to guarantee a balance between maximizing the protective effect towards tooth caries and minimizing the risk of developing fluorosis.

3. Results

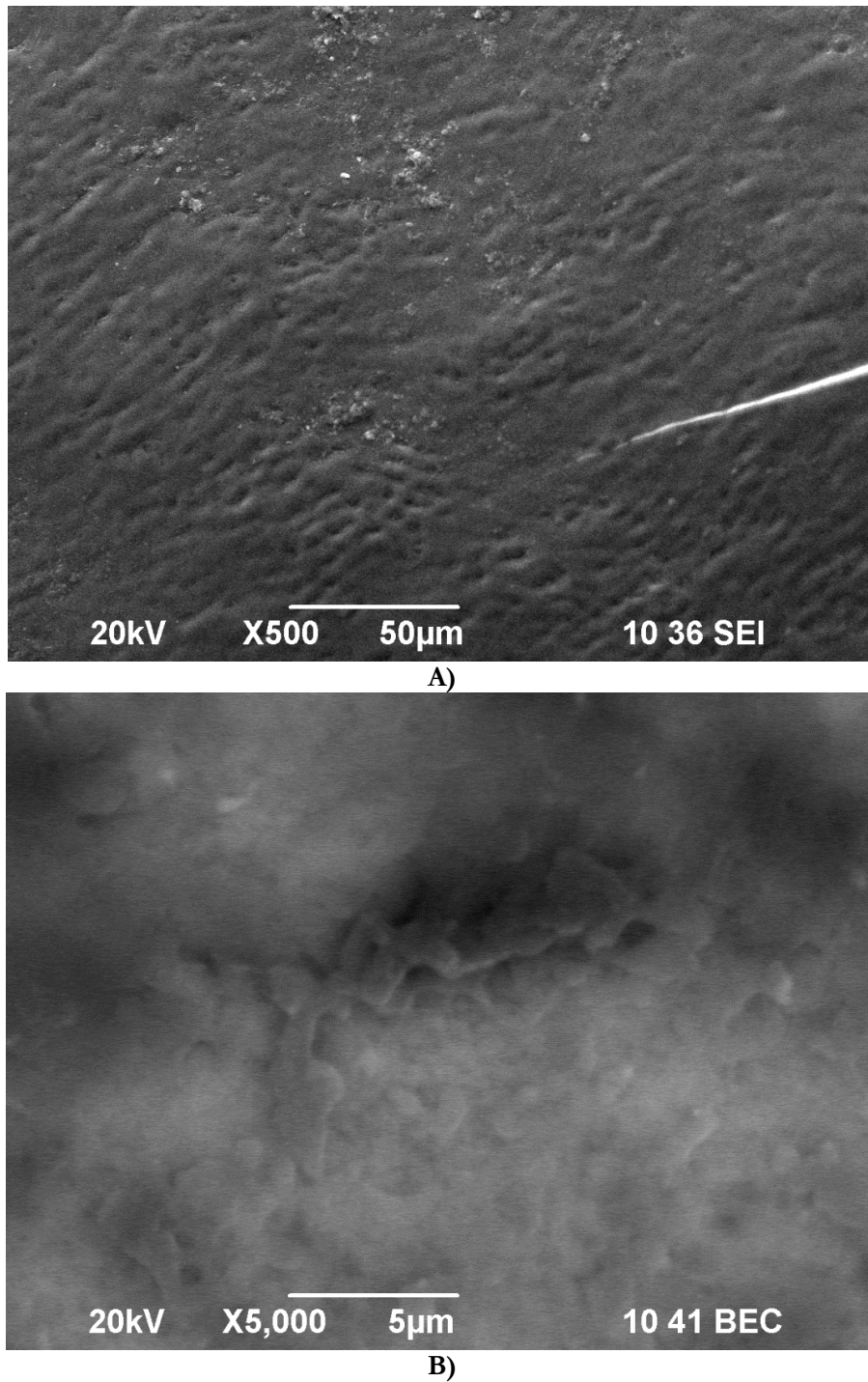


Fig. 1. A), B) Normal structure of the enamel of primary teeth with daily oral hygiene with fluoride toothpaste – 500 ppm F. Scanning Electronic Microscope - study.

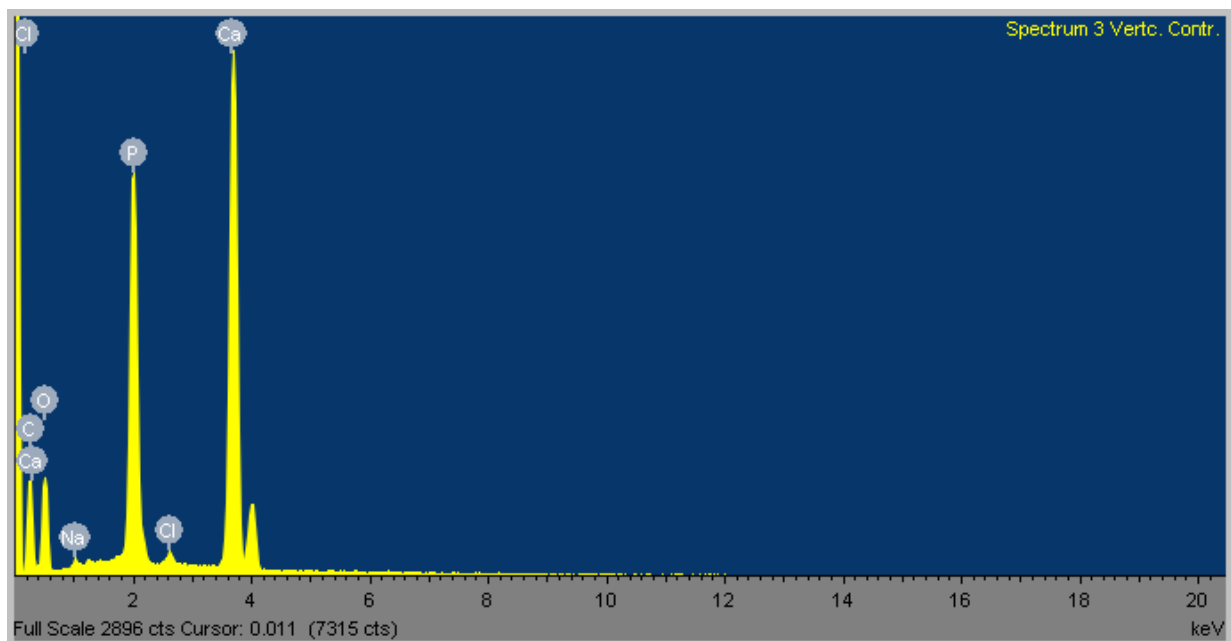


Fig. 2. Chemical analysis of the sample. Daily oral hygiene with toothpaste containing 500 ppm F-. Standard: C, CaCO₃, O, SiO₂, Na, P, Cl, Ca, Au.

Table 1. Table of the chemical analysis of the sample. Weigh and atom percentage (and standard variation) of the chemical elements on the surface of the enamel of primary teeth

Element	App Conc.	Intensity Corr.	Weight %	Weight % Sigma	Atomic %
C K	2.10	0.4585	25.46	0.90	40.28
O K	2.01	0.3517	31.70	0.74	37.64
Na K	0.06	0.7779	0.42	0.09	0.35
P K	3.41	1.3689	13.81	0.27	8.47
Cl K	0.07	0.7929	0.49	0.07	0.26
Ca K	4.87	0.9914	27.24	0.45	12.91
Au M	0.14	0.8514	0.88	0.30	0.09
Totals			100.00		

4. Discussion

4.1. Behaviours of children for oral hygiene and brushing

The duration of brushing needs to be over 1 minute in every case and the children have to be taught how to evacuate the excess toothpaste. The recommendations are to avoid rinsing with water. There is no certain evidence to point out the ideal time for tooth cleaning, but there is a recommendation that children should wash their teeth before going to sleep. Eating after night brushing should be avoided (Dimova, M. (1998), Dimova–Gabrovska, M. et al. (2016).

4.2. Clinical recommendations

The recommendations of EAPD for using fluoride toothpaste with children are presented in Table 1.

Table 2. Recommended usage of fluoride in toothpaste for children (E.A.P.D.)

Age groups of children	Fluoride concentration	Daily usage	Quantity of daily usage
6 months To 2 years	500 ppm	Two times during the day	Pea-size
2 to 6 years	1000 (+) ppm	Two times during the day	Pea-size
6 and over 6 years	1450 ppm	Two times during the day	1-2 sm.

4.3. Overview of the available child toothpastes in pharmacies:

1.ELGYDIUM junior mint kids

Child toothpaste “strawberry – mint”. It is formulated to deliver the necessary fluoride in the chemical compound for effective protection. The bound patent fluoride protects the enamel for a greater period of time and after brushing the protection of the teeth is higher. It is used with children over 2 years. It contains a filmforming agent, siliglycol for prolonged caries protection, adapted for primary teeth. Manufacturer: “Pierre Fabre Dermo-Cosmetic”, France. Composition: Sorbitol, Aqua, Silicium Dioxide, PEG-32, Aroma, Hydroxiethylcellulose, PEG-12 Dimethicone, Cl 42090, Nicometanolhydrofluoride, Sodium lauril sarcosinat, Sodium methylparabene, Sodium propylparabene, Sodium saccharine, Cl 19140. It contains Nicomethanol hydrofluoride (Fluorinol): 250 ppm F-.

2. ELGYDIUM junior bubble

Child toothpaste for children 6-12 years old with bubblegum flavor. The anticaries toothpaste with bubblegum flavor is a special edition, created to protect the enamel of the permanent teeth of children 6-12 years old, thanks to the adapted concentration of fluoride 1000 ppm fluoride ions. This mild, non-abrasive toothpaste contains Fluorinol aminofluoride (Pierre Faber patent) which connects with the enamel of the tooth and solidifies it, as well as protects it from caries. The siliglycol hinders the bacterial colonization and prolongs the effect of the fluorinol even after rinsing. Manufacturer: “Pierre Fabre Dermo-Cosmetic” France.

Composition: Sorbitol, Aqua, Silicium dioxide, PEG 32, Aroma, Hydroxiethylcellulose, PEG 12, Dimethicone, Cl 42090, Nicomethanol hydrofluoride, Sodium laurilsarcosinat, Sodium methylparabene, Sodium propylparabene, Sodium saccharine, Cl 19140. It contains Nicomethanol hydrofluoride (fluorinol): 1000 ppm F-.

3. G.U.M Kids

Two to 6 years. The toothpaste provides superior remineralization for better protection against caries and acid erosion. It consists of the unique formula of fluoride (500 ppm) and isomalt, providing 2 times more efficient remineralization. It contains 0.11% P (P sodium fluoride – 500 ppm fluoride ions). Composition: Aqua, Sorbitol, Hydrated quartz, Izomalt, Cellulose rubber, Disodium phosphate, Aroma, Titanium dioxide, Lauril glucoside, Sodium saccharine, Methylparabene, Sodium Fluoride 500 ppm, Sodium dihydrogenphosph hate Cl 173760. Manufacturer: Sunstar Suisse S.A.EU.

4. G.U.M Junior

For children 7-12 years. The toothpaste provides a high level of remineralization and better protection against caries and erosion. It consists of a combination of fluoride and izomalt, which doubles the assimilation of the fluoride in the enamel. This is a unique formula of fluoride (1000ppm) and izomalt, which protects primary teeth from acidic impact. It contains (0,22% sodium fluoride – 1000 ppm fluoride ions). Composition: Aqua, Sorbitol, Hydrated quartz, Izomalt, Cellulose rubber, Disodium phosphate, Aroma, Titanium Dioxide, Lauril glucoside, Sodium saccharine, Methylparabene, Sodium Fluoride 500 ppm, Sodium dihydrogenphosph tate Cl 173760. Manufacturer: Sunstar Suisse S.A.EU.

5. G.U.M Original White

Toothpaste, which contains fluoride. Composition: Aqua, Hydrated silicon dioxide, Sorbitol, Glycerine, PEG 8, Sodium Lauril Sulfate, Aroma, Izomalt, Titanium dioxide, Disodium C12-14 2-Sulfosuccinate, Cellulose rubber,

Panthenol, PEG 40, Hydrogen castor oil, resin, Sodium fluoride, Sodium saccharine, Algin, Stevia extract, tocopheryl acetate. It contains: 0,33% Sodium fluoride – 1490 ppm fluoride ions.

6. Nenedent (500ppm) Fluorid, Xilit (12%)

Child toothpaste with fluoride (500 ppm) and xylitol (12%) for a more pleasant brushing with a fresh, fruity taste of raspberries and strawberries. It provides a triple protection against caries. Nenedent cleans the primary teeth with silica gel and removes tooth plaque. The xylitol inhibits the development of caries bacteria, which form harmful acids. The fluoride strengthens the tooth enamel and stimulates the remineralization of the teeth.

Composition: Aqua, Hydrated silicium, Xylitol, Glycerin, Propilen glycol, Hantan resin, Titanium dioxide, Aroma (strawberry, raspberry), Sodium laurel sarcosinat, Sodium monofluorophosphate, Methylparabene, Sodium chloride, Disodium EDTA, propylparaben. Manufacturer: Berlin.

7. Fresh Time kids-Strawberry and caramel

Prophylactic child toothpaste with a pleasant scent of strawberry and caramel. It removes the plaque, strengthens the enamel and inhibits the formation of a caries lesion. It's use is recommended after every meal. It contains sodium fluoride (0,05%, active F, 250 ppm). It is recommended for children above 3 years.

Composition: Sorbitol, Silicium dioxide, Glycerin, Aqua, PEG – 8, Aroma, Sodium lauril sulfate, Cellulose rubber, Sodium methylparabene, Titanium dioxide, Sodium saccharine, Sodium fluoride, Cl 12 490. Manufacturer: Gabrovo, BG, EU.

8. Tra-La-La Kids

Gel toothpaste, suitable for everyday profilaxis of primary teeth. The bubblegum aroma turns tooth brushing into a pleasant experience. The special formula with delicate and soft effect contains 0,12% sodium fluoride, which inhibits the development of caries, without damaging the thin enamel of the primary teeth. Active ingredients: Sodium fluoride – 0,12%.

Composition: Sorbitol, Hydrated silicium dioxide, Aqua, PEG- 8, Xylitol, Sodium lauril sulfate, Aroma, Sodium laurel sarcosinat, Cellulose rubber, Sodium methylparabene, Sodium saccharine, Sodium fluoride, 2-bromo-2-nitropropane-1,3 diol, Cl 77019, Cl 77891, Cl 42051. It contains: Sodium fluoride – 0,050%, Fluoride – 250 ppm F⁻. Manufacturer: Rudozem, BG.

9. Tra-La-La Kids Tropic и Tra-La-La Kids Strawberry

It provides effective protection and profylaxis of the primary teeth. The calcium lactate provides calcium and strengthens the tooth enamel, and the sodium monofluorophosphate protects against the formation of a caries lesion. The pleasant taste of fresh tropical fruit makes it suitable for children. How to use: No swallowing. It should be rinsed with water. If the child intakes other fluor-rich products, the parents have to consult a pediatric dentist.

Composition: Sorbitol, Aqua, Hydrated silicium dioxide, Glycerin, Sodium laurel sulfate, Cellulose rubber, Aroma, Sodium monofluorophosphate, Titanium dioxide, Methylparabene, Sodium saccharine, Calcium lactate, 2 Bromo -2 Nitropropane-1,3 Lemon diol, Cl 19 140, Cl 42 051. It contains: Sodium monofluorophosphate, 0,065% fluoride, 325 ppm F⁻. Manufacturer: Rubela JSC, Rudozem.

10. Child toothpaste BILKA Homeopathy natural

Raspberry aroma for age 6+. It doesn't contain mint, fluoride or parabens. It provides special care for primary teeth. It doesn't contain conservatives and colourants. It is suitable to use with homeopathic medicaments. It contains calendula extract, hamamelis, llanten, which have anti-inflammatory and antiseptic effect, that inhibit the development of caries. Composition: Sorbitol, Aqua, Hydrated silicium dioxide, PEG-8, Sodium laurel sarcosinate, Calendula extract, Hamamelis, Llanten, Aroma, Cellulose rubber, Sodium saccharine, Sodium benzoate, Cl 14720/E 122. Manufactured: "Bilka Lifestyle" INC, Sofia.

11. Aquafresh little teeth 3-5 years

Toothpaste, that is specially designed for children between 3-5 years. It provides care and protection from caries for primary teeth. For children, aged 6 or above, a pea size quantity is enough.

It is mandatory for an adult to be present while the child is brushing their teeth in order to prevent swallowing of the product. If there is fluoride intake from other sources, the parents need to consult a Pediatric dentist. Composition: Aqua, Glycerin, Hydrated silisium dioxide, Xanthan resin, Titanium dioxide, Aroma, Caragenan, Sodium saccharine, Sodium cocamidopropyl betamine, Sodium methyl cocultaurat, Sodium fluoride, Lemon, Cl 73360, Cl 74160. It contains Sodium fluoride 0,111%w/w (500 ppm fluoride). Manufactured in Slovakia.

12. Aquafresh Kids triple protection 0-6 years

Specially manufactured for the needs of children between 0-6 years with a soft, mint taste, which stimulates daily brushing. It is advisable to use it 2 times a day, but not more than 3. To prevent swallowing of the toothpaste, it is advisable to use a pea-size quantity toothpaste. It contains sodium fluoride. If the child intakes fluoride from other sources, the parents need to consult a pediatric dentist.

Composition: Aqua, Glycerin, Hydrated silisium dioxide, Xylitol, PEG-6, Xanthan resin, Sodium fluoride, Sodium methyl cocoil taurat, Disodium phosphate, Aroma, Titanium dioxide, Sodium saccharine, Methylparabene, Propylparabene, Cl 73360, Cl 74160. Active ingredients: Sodium fluoride 0,1106%w/w (500 ppm Fluoride). Manufactured in Great Britain.

13. Vademecum JUNIOR

Child toothpaste for complete protection from caries and plaque biofilm. It contains calcium and fluoride (500 ppm) for children 0-6 years. It doesn't contain sugar. It is advisable to observe the child, while brushing, to prevent swallowing. In case the child intakes other fluoride sources, the parents should consult a pediatric dentist.

Composition: Aqua, Sorbitol, Hydrated silicium dioxide, Glycerin, Disodium phosphate, Aroma, Cocamidopropyl, Betaine, Sodium saccharine, Cellulose rubber, Sodium fluoride, Sodium chloride, Calcium glycerophosphate, Methylparabene – Cl 14 720. It contains Sodium fluoride (500 ppm). Manufacturer: Schwarzkopf & Henkel, Dusseldorf, Germany.

14. ASTERA KIDS Homeopathica 0+

Alternative toothpaste, that doesn't contain fluoride, mint, parabens, sodium lauril sulfate or sugar. It is suitable for people, aiming towards a healthier way of life or undergoing a homeopathic treatment. The products are suitable for people with mint intolerance. It can be used by all ages. Strawberry aroma. Active anti-caries protection, because of xylitol. The daily usage of xylitol leads to lowering the count of cariesogenic bacteria.

Composition: Sorbitol, Aqua, Glycerin, Hydrated silicium dioxide, Xylitol, PEG-8, Aroma, Sodium methyl cocoul taurate, Sodium citrate, Calcium gluconate, Sodium benzoate, Dichlorobenzyl alcohol, Hanthan resin, Caragenan, Hydroxiethylcellulose, Sodium saccharine, Cl 12490. Manufacturer: Aroma JSC, Sofia, BG.

15.ASTERA KIDS Apple

Gel toothpaste with a soft formula and colourful microgranules for primary teeth. It has a pleasant aroma and doesn't contain sugar. For children up to 6 years. Brushing should be executed under adult supervision, to minimize the swallowing of the product. If there is fluoride intake from other sources, the parents should consult a pediatric dentist. It contains 0,22% Sodium fluoride- 1000 ppm F. Composition: Sorbitol, Aqua, Glycerin, Hydrated silicium dioxide, PEG-8, Sodium lauril sulfate, Aroma, Benzol alcohol, Lemon, Cellulose rubber, Sodium fluoride, Sodium saccharine, Dichlorobenzyl alcohol, Sodium benzoate, Propylen glycol, Polysorbate 80, Cl 74260, Cl 75 300. Manufacturer: Aroma JSC, Sofia, BG.

16. Colgate 0-6 years

Toothpaste, specially manufactured for the needs of children 0-6 years, which stimulates daily brushing. It is advisable to use 2 times a day, but not more than 3. To minimize the chance of swallowing, it is good to use a pea-size quantity. It contains sodium fluoride. If there is another endogenic fluoride intake, it is advisable to consult a pediatric dentist.

Composition: Sodium fluoride (1000 ppm F), Sorbitol, Aqua, Hydrated silicium dioxide, PEG-12, Sodium lauril sulfate, Aroma, Cellulose rubber, Sodium saccharine, Sodium fluoride, Mica, Glycerin, Lemon, Cl 74 160, Cl 42 090. Manufacturer: Colgate - Palmolive.

17. WINX Club Kids 3+

Child toothpaste with vitamin C and fluoride for caries prevention. The formula is created in particular for care and protection of the enamel of primary teeth. Brushing should be executed under adult supervision, to minimize the swallowing of the product. A pea-size quantity is used, and brushing should be between 2-3 minutes, followed by rinsing. If the child intakes other fluoride sources, a consultation with a pediatric dentist is needed. The product is for children 3+ years. It doesn't contain parabens and colourants.

Composition: Sorbitol, Aqua, Glycerin, Hydrated silicium dioxide, Aroma, Cellulose rubber, Sodium lauril sarcosinate, Sodium saccharine, Sodium hydroxide, Sodium ascorbil phosphate, Sodium fluoride. It contains Sodium fluoride (500 ppm F). Manufacturer: Admirand, Italy.

18. BOCHKO 3+

Child toothpaste with fluoride and a strawberry aroma. Special formula that provides protection for primary teeth with calcium, which strengthens the enamel and better remineralization. It contains sodium fluoride for caries prevention. Its pleasant taste and aroma stimulate daily oral hygiene. It contains 250 ppm F-.

Composition: Sorbitol, Hydrated silicium dioxide, Aqua, Sodium lauril sulfate, Aroma, Cellulose rubber, Glycerin, Titanium dioxide, Sodium benzoate, Calcium lactate, Sodium saccharine, Sodium fluoride, Citric acid, Sorbate. Manufacturer: Lavena JSC, Shumen, BG.

19. Baby toothpaste with strawberry aroma

It contains a special formula with low abrasion. The xylitol inhibits the development of cariesogenic bacteria, strengthens the enamel and protects the gums from inflammation. It doesn't contain fluoride, which makes the toothpaste harmless if swallowed. No conservants or colourants. The fruity aroma helps with brushing with babies and smaller children. It is compatible with homeopathic treatment. A pea-size is used on a toothbrush or a finger brush to gently clean the teeth, gums and tongue, followed by rinsing.

Quantity: 50ml. No parabens, colourants, fluoride or sugar.

Composition: Glycerin, Aqua, Hydrated Silica, Xanthan Gum, Xylitol, Titanium Dioxide, Sodium Lauril Sarcosinate, Aroma, Disodium EDTA, Sodium Chloride Active components: Xylitol is a natural sweetener, which prevents the development of cariogenic bacteria. It increases the remineralization of the enamel and decreases plaque accumulation. Manufacturer: Lavena JSC, Shumen, BG.

20. Baby toothpaste with banana aroma

Special formula with low abrasion. The xylitol prevents the development of cariogenic bacteria, strengthens the enamel of primary teeth and protects the gums from inflammation. It doesn't contain fluoride, conservants or colourants. The fruity aroma helps with brushing. It is compatible with homeopathic treatment. A pea-size is used on a toothbrush or a finger brush to gently clean the teeth, gums and tongue, followed by rinsing. The xylitol is a natural sweetener, which prevents the development of cariogenic bacteria. It increases the remineralization of the enamel and decreases the plaque accumulation as well as protect the gums from inflammation. Manufacturer: Lavena JSC, Shumen, BG.

Composition: Glycerin, Aqua, Hydrated Silica, Xanthan Gum, Xylitol, Xanthan Gum, Titanium Dioxide, Sodium Lauroyl Sarcosinate, Aroma, Disodium EDTA, Sodium Chloride.

21. Child toothpaste with a bubblegum taste and aroma

Special formula without fluoride. The pleasant aroma and taste stimulate daily brushing. The briar extract helps constrict the gums and is rich in vitamin C. It contains the optimal level of calcium needed for the child. Quantity: 75ml. No fluoride or sugar.

Active compounds: Briar – with high levels of vitamin C, as well as vitamins P,B,E,K and carotin. It has a gentle constricting and adstringent effect. Manufacturer: Lavena JSC, Shumen, BG.

22. Dentolux for Kids-0-6 years

Dentolux toothpaste is suitable for children 0-6 years. It is mandatory for parents to observe their children while they brush their teeth and help if needed. It contains sodium fluoride (500 ppm F⁻).

Composition. Aqua, Sorbitol, Hydrated silicium dioxide, Propylen glycol, Sodium hydrogen sulfonate, Xanthan resin, Aroma, Sodium saccharine, Toccoferyl acetate, Sodium fluoride, Methylparabene, Mica, Eugenol, Cl 74 160. Manufactured in Germany.

23. Looney Tunes Active

Child toothpaste with vitamin C.

Composition: Sorbitol, Aqua, Glycerin, Hydrated silicium dioxide, Aroma, Cellulose rubber, Sodium laurilsarcosinate, Sodium saccharine, Sodium hydroxide, Sodium ascorbil phosphate, Sodium fluoride. It contains sodium fluoride: 500 ppm F⁻. Manufactured in Italy.

24. Colgate Max Fresh with Cooling Cristals

Composition: Sodium fluoride 0,32%w/w (1450 ppm F⁻). This product is not suitable for children under 7 years . Manufacturer: Colgate – Palmolive, Poland.

25. Parodontax - Gentle Whitening

It contains sodium fluoride 0,306%w/w (1450 ppm F⁻). A pea-size quantity is used for children to 6 years, under adult supervision. If there is another form of fluoride intake, the parents need to consult with a pediatric dentist.

Composition: Sodium bicarbonate, Aqua, Sorbitol, Glycerin, Hydrated silicium dioxide, Alcohol, Mint oil, Sodium laurel sarcosinate, Ecchinacea, Silicium dioxide, Xanthan resin, Sodium fluoride, Crameria triandra extract, Calendula extract, Coccamidopropyl betamine, Salvia oil, Mirra extract, Sodium saccharine, Sodium benzoate, Linolol. Manufactured in Slovakia.

26. Parodontax.

Everyday toothpaste, containing fluoride.

Composition: Sodium bicarbonate, Aqua, Glycerin, Coccamidopropyl betamine, Crameria triandra extract, Ecchinacea, Xanthan resin, Sodium fluoride, Mirra extract, Sodium saccharine, Sodium benzoate, Salvia oil, Mint oil, Mint arvenis oil, Cl 77 491. It contains sodium fluoride 0,31%w/w (1400 ppm F⁻). It is not suitable for children under the age of 12. It is to be used 3 times a day. Manufactured in Romania, GlaxoSmithKline.

27. GC Tooth Mousse

Topical cream with bio-active calcium and phosphate ions. Composition: Aqua pura, Glycerol, Casein phosphopeptide, Amorphous calcium phosphate, D-sorbitol, Propylen glycol, Silicon dioxide, Titanium dioxide, Xylitol, Phosphoric acid, Aromatisors, Zinc oxide, Sodium saccharine, Ethyl-n hydroxibenzoate. For professional use and at home use, with prescription from a pediatric dentist. Manufacturer: GC Corporation, Tokyo, Japan; Recaldent.

28. Biorepair^R Junior, 50 ml

The first toothpaste with a fluorine-free formula. Suitable for children under 7 years of age. It has a remineralizing effect during orthodontic treatment with orthodontic appliances. It contains a non-titanium dioxide-free formula, abrasive silicates, sodium lauryl sulfate and parabens. Contains microRepair^R particles that are very similar to the particles of enamel (Roverly N.et al., LEBSO).

Main principles of oral prophylaxis:

1. To guarantee balance between maximizing the protective effect towards tooth caries and minimizing the risk of fluorosis.
2. Clinicians have to maintain a balance between their practical experience and the preference of the family.
3. The social – economy level of different countries can also effect the recommendation.

5. Conclusions

The daily use of a fluoride toothpaste in combination with instructions for oral hygiene has a lead role in caries prevention. It has to be used in addition to other prophylactic methods, such as healthy eating and exogenous fluoride application. When a fluoride toothpaste is used with other fluoride medicaments, the cumulative effect of the fluoride has to be taken into account for children under the age of 6.

CONFLICTS OF INTEREST. The authors declare that there are no conflicts of interest.

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