

Inorganic Pharmaceutical Chemistry

Lec 10: Dental Products

3rd Stage- College of Pharmacy

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Dental products

- **Dental products are the pharmaceutical preparations widely used in dentistry for the following aspects –**
 - **To prevent dental caries as anticaries agent**
 - **To clean & polish teeth.**
 - **To bring freshness to the mouth**
 - **To reduce the sensitivity of the teeth to hot & cold.**
 - **To prevent various periodontal disease.**

Dental caries (i.e. cavities or holes in the teeth) are formed by the growth and implantation of cariogenic microorganisms.

Causes of dental caries

1. Bacteria (mainly *Streptococcus mutans* and *Lactobacillaceae*) that produces lactic acid
- If the concentration of lactic acid becomes high enough it can cause the pH to drop below 5.5 and so this lactic acid demineralize enamel (calcium salts of teeth dissolves faster in acidic medium).
 - If demineralization continues over time, enough mineral content may be lost so that the soft organic material left behind disintegrates, forming a cavity or hole.

2-Diet:

- Fermentation of carbohydrates can lead to the formation of dental caries.
- Food with a high concentration of sucrose increases the risk of dental caries.
- Sucrose is metabolized by streptococcus mutans to glucans, that forms plaque and is Readily metabolized by the Lactobacillus acidophilus to form lactic acid that destroy the hydroxyapatite.
- Fructose and lactose are less cariogenic. Inadequate intake of fluoride (less than 0.3 ppm) during calcification of teeth.
- The greater frequency of carbohydrate intake causes dental caries and not the amount of carbohydrate intake.

3-Salivary dysfunction

- Salivary proteins protect the enamel from acid dissolution and also act as antimicrobial agents. Saliva is the primary resource of calcium, phosphate and fluoride, the materials used to remineralise the enamel.
- Saliva also acts quickly to clear away food debris from the mouth and to buffer the organic acids that are produced by the bacteria.
- Saliva is therefore a very vital and complex material in the prevention of dental caries.
- Thus, salivary dysfunction can lead to rapid deterioration of dental enamel. Salivary dysfunction can occur whenever certain medications are taken or medical treatments such as radiotherapy are undergone.

Formation of dental caries

CHO $\xrightarrow{\text{binds with Lactobacillus bacteria}}$ Lacticacid

↓

Forms a layer named plaque and eventually pocket form on the tooth surface

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Food particles can lodge and build up in these pockets or holes (caries) which are degraded by bacteria present in the mouth.

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This caries become deep day by day & produce pain & inflammation

Prevention of dental caries

1- Oral hygiene

Oral hygiene is the practice of keeping the mouth and teeth clean to prevent dental problems.

2-Diet: minimizing intake of CHOs to prevent bacterial growth that contribute of caries

3- Flouride therapy: flouride is anti cariogenic

- **Mode of action of flouride:**
 - Flouride replaces the hydroxyl ion in hydroxyapatite with the flouride ion to form flouroapatite on the outer surface of the enamel. Fluoroapatite hardens the enamel and makes it more acid resistant.
 - Fluoride also has demonstrated antibacterial activity.

Fluoride supplement :

- Fluoride supplements like tablet, drops, lozenges, table salt etc. offer an alternative source of systemic fluoridation where water fluoridation is not feasible.
- These supplements are usually administered continuously on a daily basis from birth to the pre-eruptive maturation of permanent teeth.

Dentifrices

A **dentifrices** is a substance used with a toothbrush for the purpose of cleaning the accessible surface of The teeth

this term is derived from dens means (tooth) & fricare means (to rub).

Types of Dentifrices:

1. **Cosmetic Dentifrice:** they effective in removing of extrinsic staining that occur on tooth surface often the end product of bacterial metabolism ,range from green to yellow to black .

2. **Therapeutic Dentifrice:** they must reduce some disease process in mouth such as caries incidence ,gingivitis , calculus formation ,tooth sensitivity .

Dental products

Colgate® Total Original Toothpaste

- Glycerin.
- Aqua.
- Hydrated Silica.
- Sodium Lauryl Sulfate.
- Arginine.
- Aroma.
- Cellulose Gum.
- Zinc Oxide.
- Tetrasodium Pyrophosphate.
- Xanthan Gum.
- Benzyl Alcohol.
- Cocamidopropyl Betaine.
- Sodium Fluoride.
- Sodium Saccharin.
- Phosphoric Acid.
- Sucralose.

Crest Tooth past components

Stannous Fluoride 0.454% (0.16% W/V Fluoride Ion). Inactive Ingredients: Glycerin, Hydrated Silica, Sodium Hexametaphosphate, Propylene Glycol, PEG-6, Water, Zinc Lactate, Trisodium Phosphate, Flavor, Sodium Lauryl Sulfate, Sodium Gluconate, Carrageenan, Sodium Saccharin, Xanthan Gum

Biofresh tooth paste

Sorbitol, Aqua, Hydrated Silica, Mentha Piperita Leaf Water*, Aloe Barbadensis Leaf Juice*, Lauryl Glucoside, Xanthan Gum, Aroma, Sodium Fluoride, Sodium Benzoate, Stevia Rebaudiana Extract, Citric Acid, Potassium Sorbate.