Dental Preventive materials

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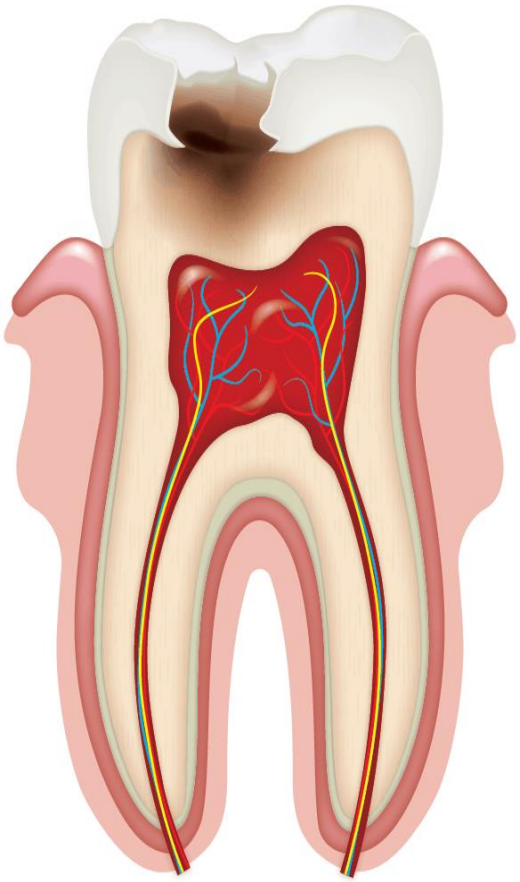
Preventive materials

Dental preventive materials refer to a range of products and substances that are used to prevent or reduce the risk of dental problems such as

- tooth decay or caries (What is the meaning of dental caries)
- gum disease,
- oral infections.

Dental caries is a chronic infectious disease resulting from tooth-adherent cariogenic bacteria that metabolize sugars to produce acid, which over time demineralizes tooth structure



Preventive materials

These materials are designed to promote good oral hygiene and prevent the buildup of plaque and bacteria in the mouth.

Dental preventive materials include products such as

- fluoride varnish,
- dental sealants,
- toothpaste,
- mouthwash,
- dental floss,
- interdental brushes,
- chewing gum.

Preventive materials

These materials are often recommended by dental professionals as part of a comprehensive dental care routine to help patients maintain good oral health and prevent the need for more invasive dental treatments in the future.

Generally preventive dental materials can be classified as:

1. **Chemotherapeutic agents**
   a) Dentifrices
   b) mouth washes
   c) fluoride varnishes
2. **Resin sealants**
   a) self cure
   b) light cure
3. **Glass ionomer sealants and resin modified glass ionomer sealants**

Dentifrices(tooth paste)

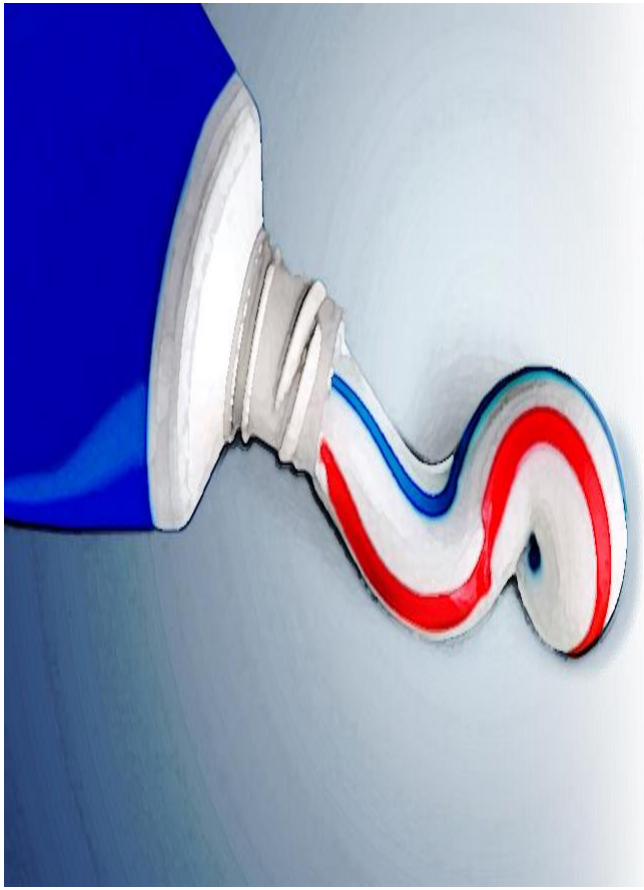
Dentifrices(tooth paste)

Function of tooth pastes

- ❖Enhance cleaning of exposed tooth surfaces
- ❖Removal of plaque ,and debris
- ❖Carrier for fluoride, detergents, abrasives and whitening agents to improve esthetic of teeth.

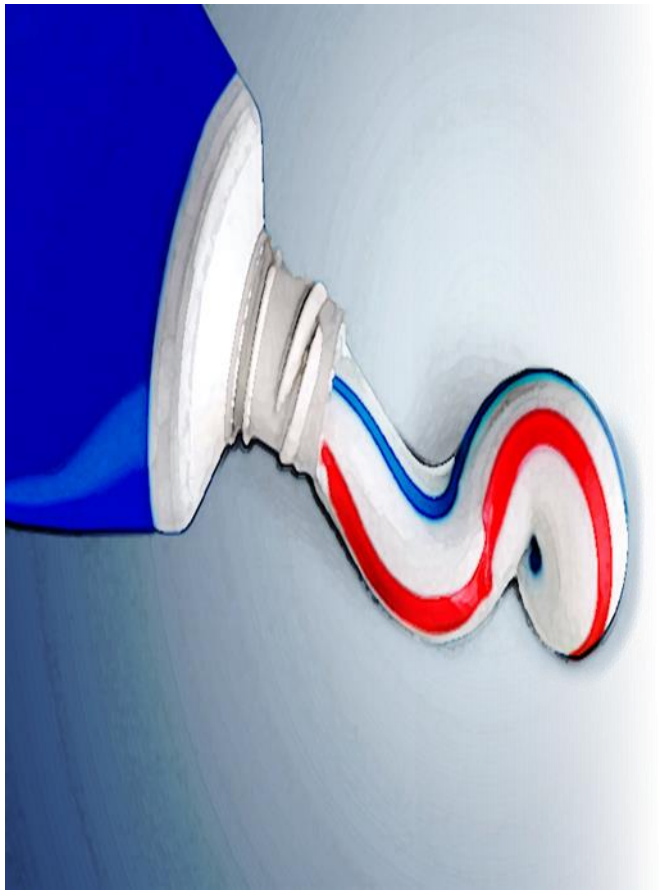
General composition of tooth pastes

- ***Colloidal binding agents:*** they act as carrier for the active ingredients ex: sodium alginate.
- ***Preservatives*** to inhibit bacterial growth within the paste.
- ***Flavouring agents:*** peppermints, wintergreen, cinnamon
- ***Abrasives:*** aid in the removal of heavy plaque and adhered stains and calculus ,like calcium pyrophosphate.



General composition of tooth pastes

- ***Humectants*** :to stabilize the composition and reduce the water loss by evaporation
- ***Detergents:*** like sodium lauryl sulfate to reduce surface tension and enhance removal of debris
- ***Therapeutic agents:*** like stannous fluoride to improve resistance to caries 0.025-0.15%
- ***Other chemicals:*** minor amounts to reduce corrosion, give color, remove discoloration.



Mouth washes:

Mouth washes:

They are composed of three main ingredients:

- Active agents which is selected for specific health care benefit such as anticarious activity, anti-microbial effect, fluoride delivery or reduction of plaque adhesion
- Solution of water or alcohol to dissolve the active agents
- Surfactants: help to remove debris and dissolve other ingredients, flavoring agents to breath freshness like eucalyptol, menthol and thymol.

The main active ingredients are Chlorhexidine and fluoride

Mouth washes:

Disadvantages **:**

- High ethanol content produce softening effect on resin restoration
- Staining effect of chlorhexidine and euogenol in some mouth washes
- Toxicity with high ethanol content

Fluoride varnishes:

Fluoride varnishes:

- The fluoride is dissolved in organic solvent that evaporate when applied or sets when exposed to moisture leaving thin film of calcium fluoride deposited on the tooth surface which later converted to fluroapatite by remineralization reaction.
- It differs from mouth wash its action last for several hours before vanish wears while the mouth wash for seconds.

Fluoride varnishes:

- It is ***used*** in young children with high risk of caries ,also in old patients to prevent root caries
- ***Disadvantages***: bitter taste and tooth discoloration which is transient.

Pit and fissure sealants:

Pit and fissure sealants:

- Deep pits and fissures are difficult to clean and more susceptible to caries and fluoride treatment was least effective in prevention of caries.
- In 1965 the first technique was called occlusal sealing.

Pit and fissure sealants:

- Methyl -2- cyanoacrylate mixed with polymethyl methacrylate and inorganic powder.
- Then placed in the pits and fissures and cyanoacrylate polymerize when exposed to moisture.

Glass ionomer sealants

Glass ionomer sealants

- ***Requirements of dental sealants:***
  - high flow and good wetting to the surface
  - good wear resistance
  - high compressive strength and rigidity
  - tooth colored
  - less solubility
  - good bond to tooth
- coefficient of expansion and contraction compatible with the tooth

Rest for 5 min. only

Finishing & Polishing Materials

Finishing Materials

Dental restorations are finished before placement in the oral cavity to provide:

- Good oral health.
- Function.
- Esthetic.

Finishing Materials

- **Good oral health is maintained by:**
  - Resisting the accumulation of food debris and pathogenic bacteria by reducing the roughness of the surface.
  - Smooth surfaces are easier to maintain in hygienic state, also with some metal restoration, tarnish and corrosion activity can be reduced if the surface is highly polished.

Finishing Materials

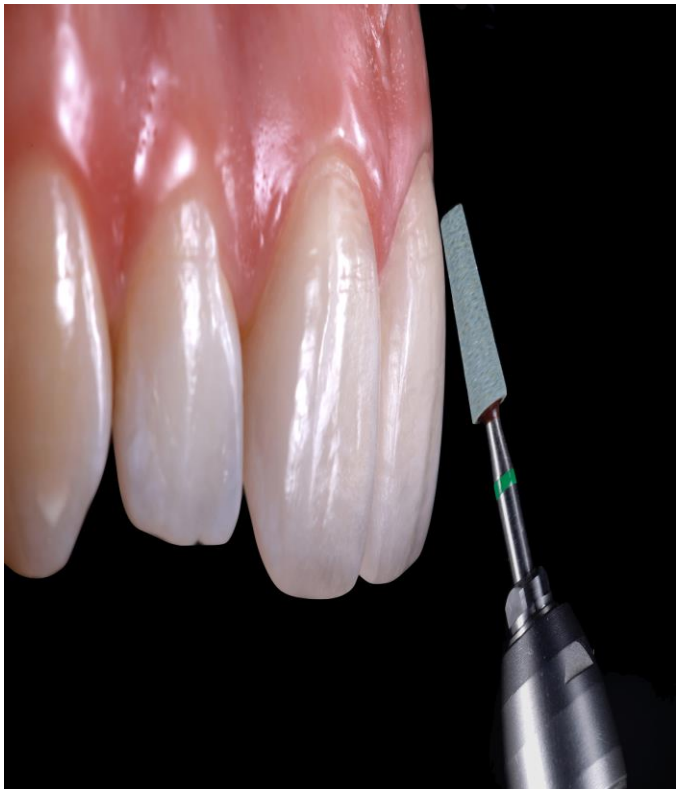
- **Abrasion** is the process of wear on the surface of one material by another material.
- The material that causes the wear is called an **abrasive** material.
- **An abrasive material** is a material which is harder than the material which needs to be abraded (restoration or appliance).

Finishing Materials

- The abrasive particles should posses' sharp edges that cut rough surface of the abraded material.
- The abrasive particles could be bonded together to form
  - grinding wheel or
  - may be carried across the surface of bristles of a revolving brush or
  - bonded to a piece of cloth or paper and rubbed across the surface.

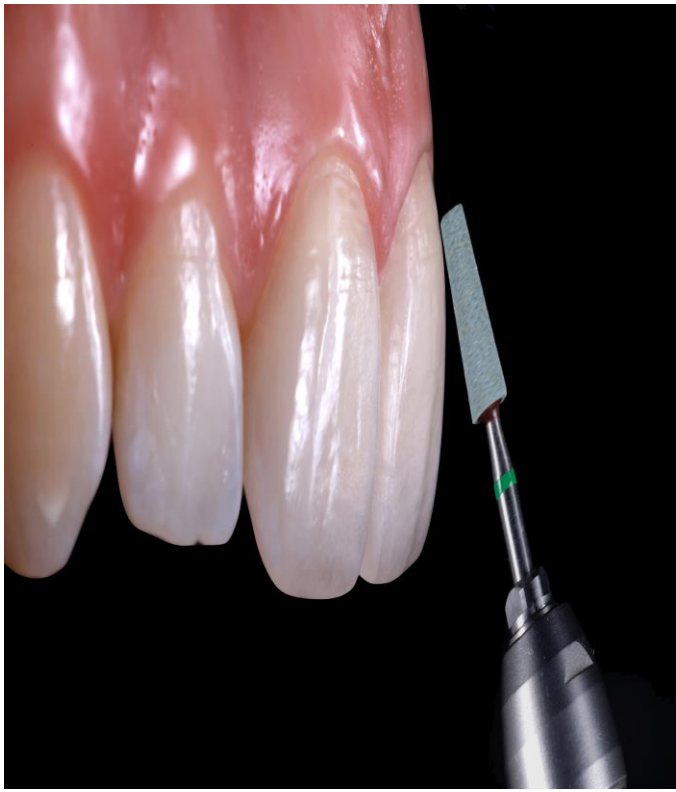
The smoothness of the surface depends on:

- **Hardness and shape of the abrasive particles:** the abrasive particles should be harder than the material which is braded and should be strong
- **Size of the particles:** large particles have wide cutting edge and cut more than smaller size,
- So start with large size then fine size.



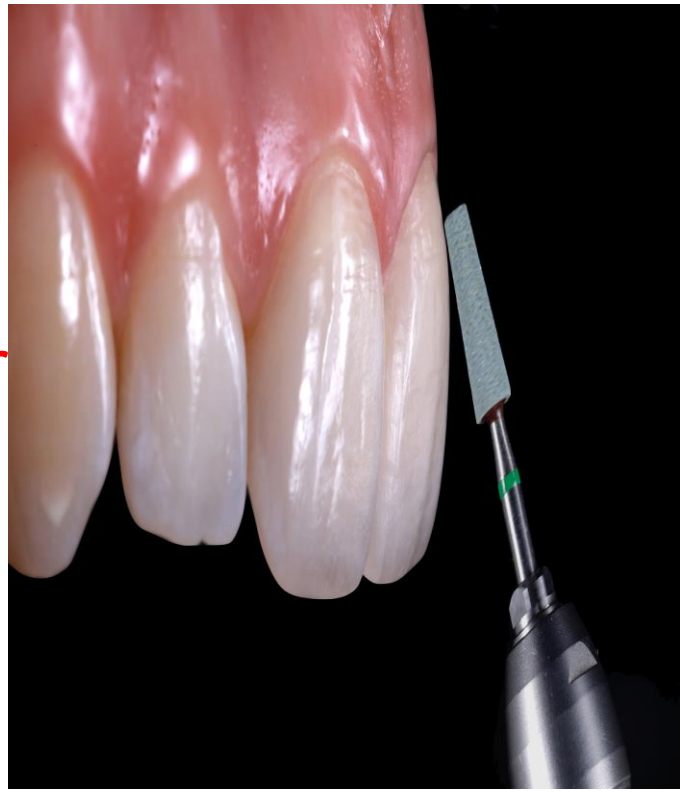
The smoothness of the surface depends on:

- **Speed of movement:** the slower speed of movement, the deeper the scratches which are produced but in slow speed and in high speed; the total amount of material removed will be approximately the same (1450-3000rpm).
    - To increase the speed of the abrasive, it is suggested to use compressed air to blast an abrasive powder on the surface (sand-blasting).
    - It is useful for co/cr alloy or to use ultra-sonic frequency vibration.



The smoothness of the surface depends on:

- **Pressure:** always only slight pressure should be applied,
  - *High pressure will lead to ???*
  - *increase the rate of wear of the abrasive; also the heat produced.*



Abrasive materials:

Diamond most effective abrasive for dental use, diamond chips can embed in a porcelain binder to form diamond disc.

Sand an intermediate abrasive has satisfactory hardness, can be used with high pressure in sandblast machine or in form of sand paper to remove coarse scratches.

Quartz particles obtained by crushing sand stone and bonded to paper.

Abrasive materials:

Garnet combination of silicate with (aluminum or magnesium or cobalt). Used as abrasive in dental polishing disc.

Emery (corundum) natural oxide of aluminum.

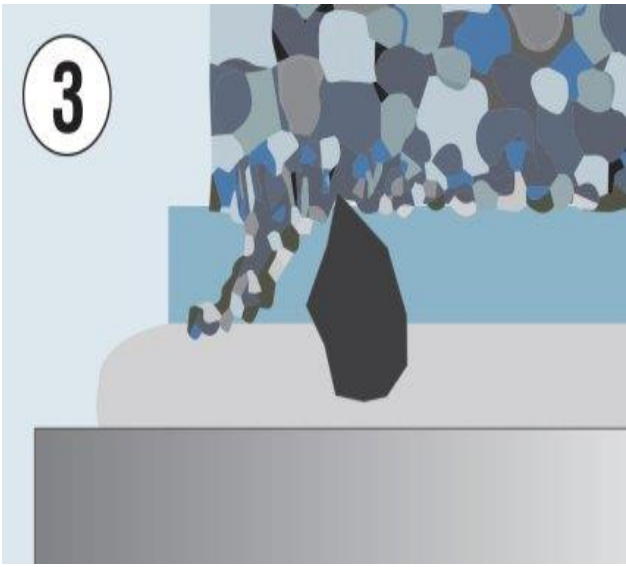
Pumice fine abrasive obtained by crushing pumice stone; porous volcanic rock, usually mixed with water or glycerin with low speed, it is excellent for denture polymer; suitable for gold alloy, tooth surface and amalgam.

Polishing

Polishing

It’s the process by which the fine scratches are filled by fine particles, being removed from the surface and so produce a smooth surface.

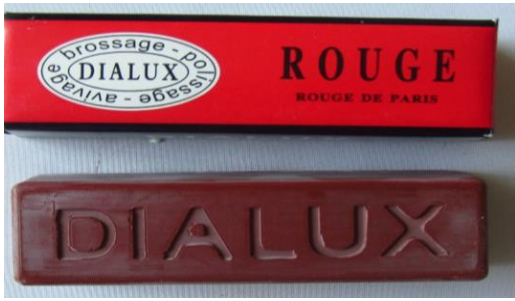
Polishing agents: very-small-particle-size (submicron-size) abrasives materials used to produce a polished layer or smooth surface, probably due to that; the rapid movement of the polishing agent across the surface heats the top of the material and cause it to flow and fill in the scratches.



Polishing

Polishing materials

Rouge: (iron oxide): red fine powder or cake. It's rather dirty to handle but it produce an excellent shine on gold alloy but not used with stainless steel; we use chromic oxide.



Tripoli: obtained from porous rock, mild polishing.

Tin oxide (SnO2): used for polishing teeth and restoration inside the patient moth, extremely fine (putty powder).

Whiting (precipitated chalk): it is mild abrasive used for softer materials and polymers, mixed with water.

Dental prophylaxis pastes

Dental prophylaxis pastes

- Prophylaxis pastes should be remove stains without damaging the underlying tooth structure or adjacent restorative materials.
- The abrasive selected should be harder than the surface stain being removed and softer than the tooth surface.
- The most common abrasives used in prophylaxis pastes are pumice, silica, zirconium silicate, and other silicates.

Dental prophylaxis pastes

Tooth paste (Dentifrices)

Dentifrice pastes are used for removing debris and minor stains from teeth and for polishing tooth surfaces.

- The most commonly used abrasives are
- dibasic calcium phosphate dihydrate,
- anhydrous dibasic calcium phosphate,
- tricalcium phosphate,
- calcium pyrophosphate,
- hydrated alumina.

Dental prophylaxis pastes

Tooth paste (Dentifrices)

Many dentifrices contain therapeutic agents, such as

- sodium fluoride,
- stannous fluoride,
- sodium monofluorophosphate,

The function of therapeutic agents are:

- to decrease the acid solubility of tooth enamel,
- decrease hypersensitivity,
- interrupt the mechanisms of plaque attachment and calculus formation on tooth structure.

Denture cleaners

Denture cleaners

Food debris, plaque, calculus, and stains may accumulate on denture base materials in the same way as natural teeth.

Soaking in a denture cleanser solution or brushing with or without a paste or powder (with soft brush, soap & water) is usually effective method to keep the denture clean.

Denture cleaners

Denture cleaner materials

- Powder and paste, which consist mainly of finely divided chalk, zirconium or pumice and flavoring agent; it is quite abrasive and should not be used vigorously over a period of time.
- Peroxide cleaner, powder or tablets composed of sodium perborate which releases peroxide mixed with alkaline material as trisodium phosphate also detergent and flavoring.

Denture cleaners

Denture cleaner materials

- Dilute hydrochloric acid, dissolves calcified deposits, it's applied locally to heavily contaminated areas of denture.
- Dilute hypochlorite solution (chlorine) should not be used with metals,
- if high concentration is used it may bleach the polymer if immersed regularly in it.

Denture cleaners

Denture cleaning consideration

- Dentures should not be soaked in hot water, which may warp the denture base material.
- Tooth paste with organic solvents like chloroform should be avoided, as they may cause crazing and cracking of the denture material.

Denture cleaners

Denture cleaning consideration

- Hard-bristle brushes or brushing with much force may abrade the plastic surface of the denture.
- Sodium hypochlorite should not be used in high concentration or for long time because it may bleach the polymer color.

Denture cleaners

Denture cleaning consideration

- Sodium hypochlorite should not be used with metals denture base.
- House hold cleansers, bathroom abrasives & dentifrice with chloroform are contraindicated.


Thank You!