DENTAL CARE COSMETICS

DENTIFRICES

POWDER, PASTE, GELS, MOUTHWASH

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HISTORY

- Tooth powder was generally used among the Romans, who used a variety of substances, such as the bones, hoofs, and horns of certain animals; crabs; egg-shells, and the shells of the oyster. They were reduced to a fine powder after having been previously burnt, and sometimes mixed with honey.
- It wasn’t until 1824, when American dentist named Peabody started adding soap to his paste that things started to change.
- In 1873, Colgate started to mass produce their soap based toothpastes in jars.

HISTORY

- The first “tube” of toothpaste was invented when Dr Lucius Sheffield introduced his crème dentifrice in 1886.
- It wasn’t long thereafter, that colgate started selling their toothpastes in collapsible tubes as well.
- Fluorides were introduced to toothpastes in 1960’s.

Tooth

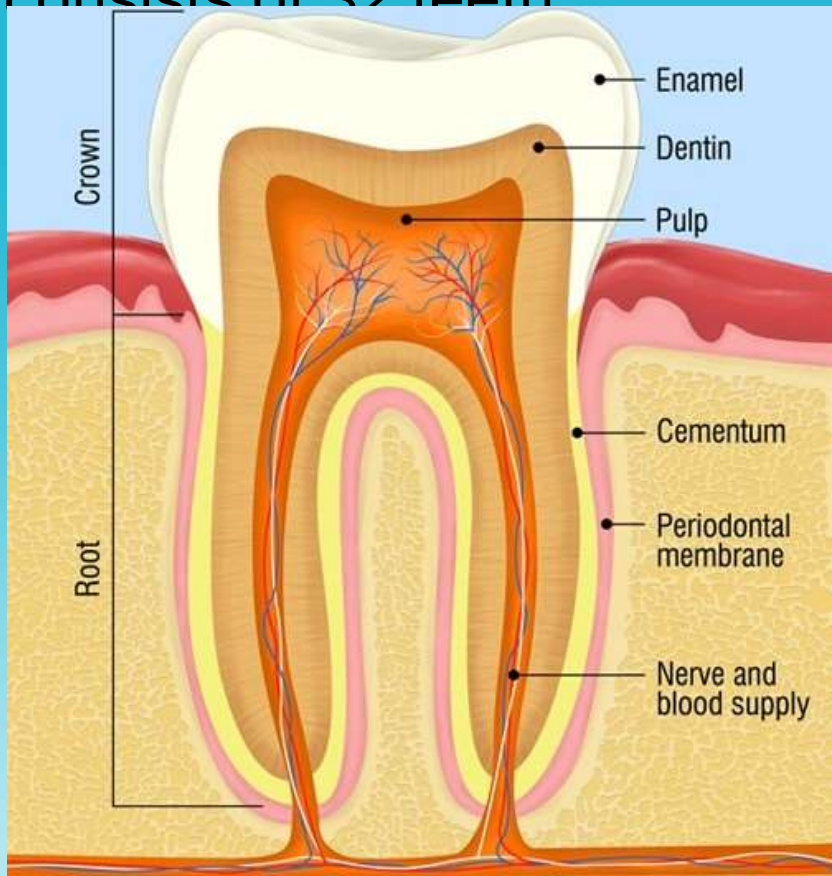
A tooth is a hard , calcified structure found in the jaws(or mouth) of many vertebrates & used to break down food .

The teeth roots are covered by gums.

Anatomy of teeth

- Humans are diphyodont, meaning that they develop two sets of teeth throughout life . The first set (the ‘baby’ , ‘milk’ , ‘primary’, or ‘deciduous’ set) normally starts to appear at about six months of age.
- The second permanent set of teeth consists of 32 teeth
- Teeth have parts including :

⦁ Dentin
⦁ Pulp
⦁ Cementum
⦁ Enamel
⦁ Peridontal membrane
⦁ Nerve & blood supply



I] Tooth Anatomy :

1. CROWN OF THE TOOTH

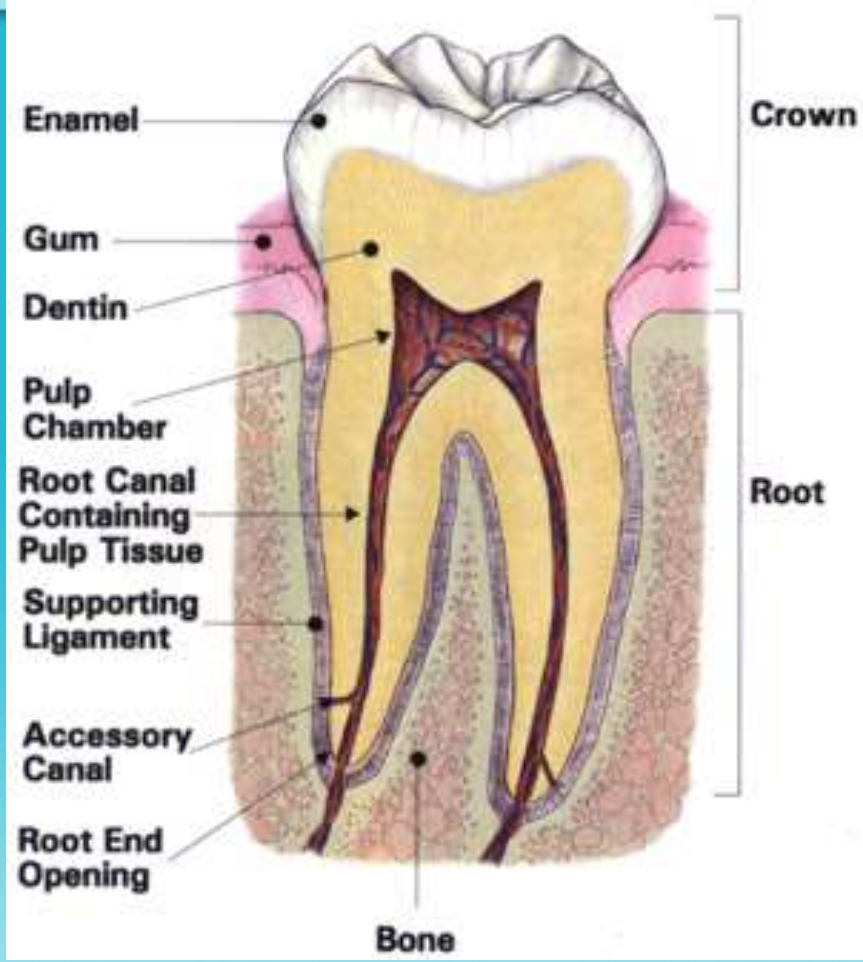
(part of the tooth above the gum line.)

(a) Enamel
(b) Dentin.

2. ROOT OF THE TOOTH

(sits in the bone below the gum line)

(a) Pulp Chamber &Root Canal
(b) Bone
(c) Periodontal ligament



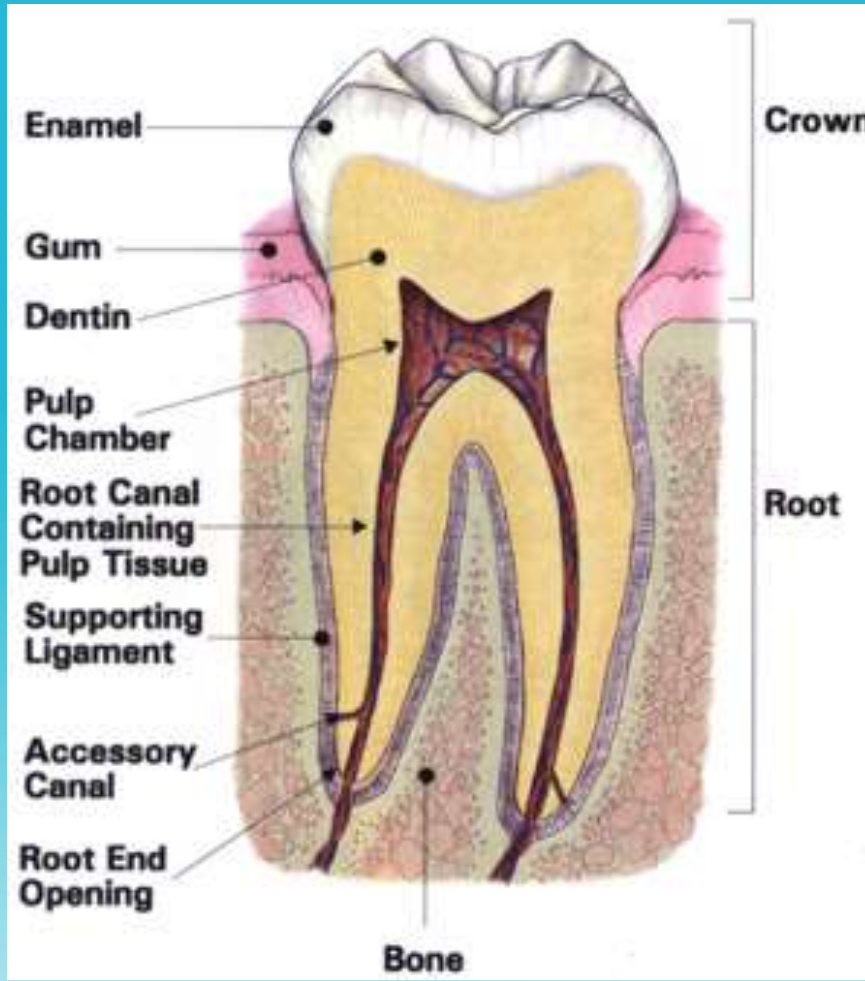
1. CROWN OF THE TOOTH

(a) Enamel :

- is the first layer of the tooth
- considered to be the strongest tissue in our body.
- When we chew, our bite exerts about 130 pounds of pressure on our teeth.
- protective shield to the rest of the tooth structure.

(b) Dentin.

- very strong structure, although it is much weaker than enamel.



2. ROOT OF THE TOOTH

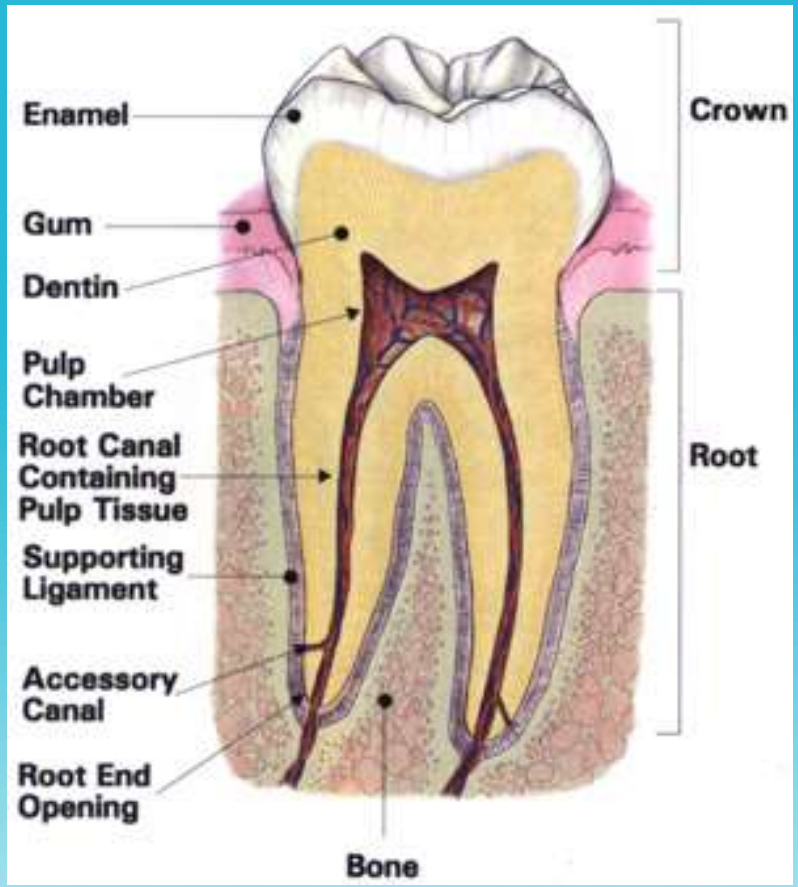
a. Pulp Chamber & Root Canal:

- hollow area →life source for the tooth.
- **Pulp** : nerve, artery, & vein.
  → provides nourishment for the tooth during growth & development.

b. Bone: is around the roots of the tooth acts as an anchor.

c. Periodontal ligament :

- layer between the bony socket & the root of the tooth.
- acts as a cushion, to protect the tooth & the bone against the shock of chewing and biting.



II] Dental Caries

- **Dental caries = tooth decay :**

-is an infectious disease which damages the structures of the teeth.

- The disease can lead to **pain**, **tooth loss**, **infection**, and, in severe cases, death !!

Continued : Detal Caries

- caused by certain types of **acid-producing bacteria** :

  → damage in the presence of fermentable carbohydrates such as sucrose, fructose, & glucose.

  → results in **acidic levels** in the mouth

  →affect tooth's special mineral content causes it to be sensitive to low pH.

- if pH drops below **5.5**

  → demineralization proceeds faster than remineralization (i.e. there is a net loss of mineral structure on the tooth's surface).

III] Maintaining Oral hygeine :

- Good oral hygiene results in a mouth that looks and smells healthy. This means:

1. teeth are clean and free of debris
2. Gums are pink and do not hurt or bleed when you brush or floss
3. Bad breath is not a constant problem

1. **Daily preventive care** including: proper brushing and flossing.
   - will help stop problems before they develop.

2. **Regular visits** to the dentist every 6 months .

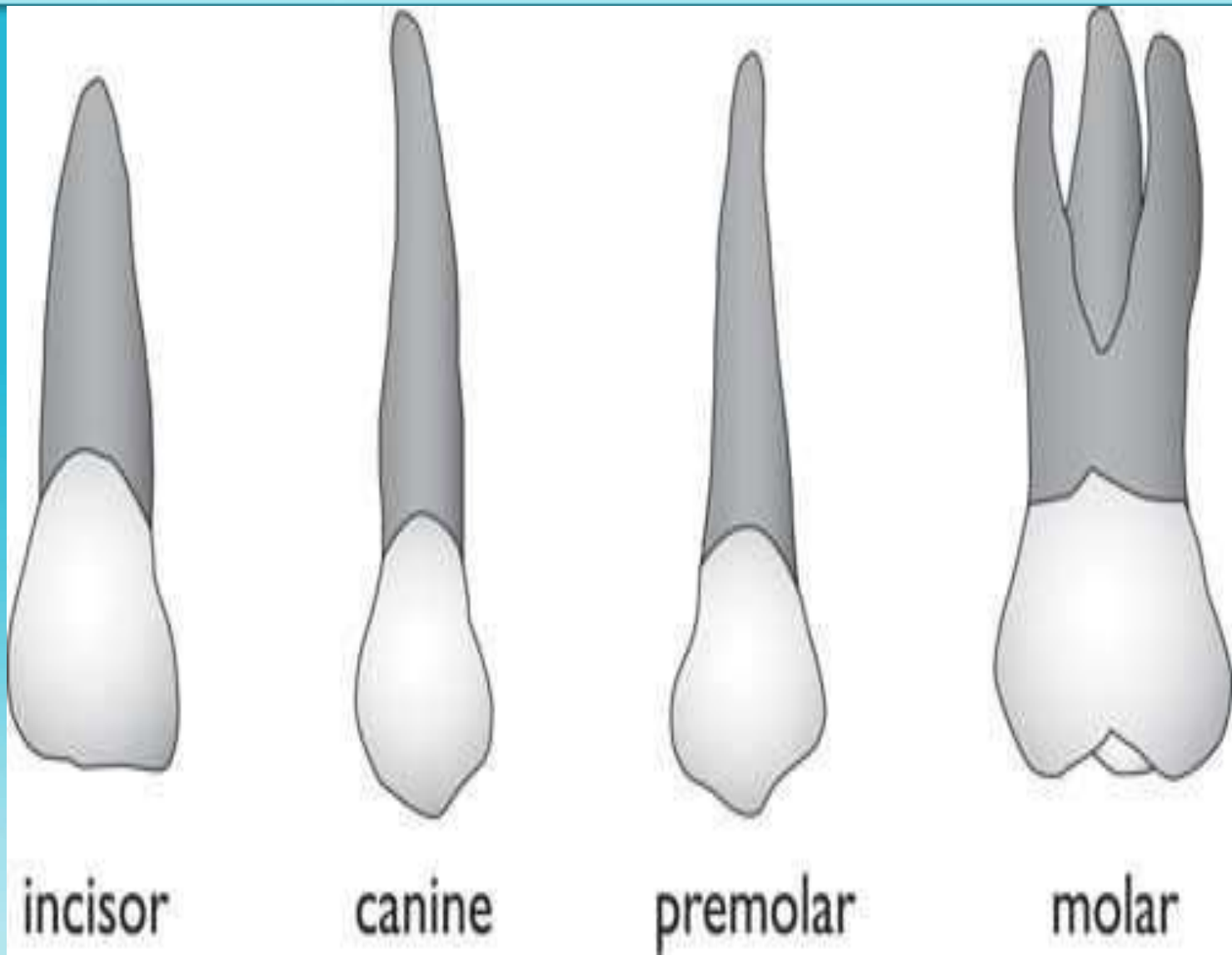
3. **In between** regular visits to the dentist, there are simple steps that each of us can take to greatly decrease the risk of developing tooth decay, gum disease and other dental problems.

These include:

1. Brushing thoroughly twice a day and flossing daily
2. Eating a balanced diet and limiting snacks between meals
3. Using dental products that contain fluoride, including toothpaste
4. Rinsing with a fluoride mouthrinse
5. Making sure that your children under 12 drink fluoridated water or take a fluoride supplement if they live in a non-fluoridated area.

Classification of Teeth

- **Incisors**
- **Canines**
- **Premolars**
- **Molars**



DEFINITION

Dental care products : Dental products are mainly used for treating and or cleaning the teeth.

Dentifrice is a paste, gel or powder used with a toothbrush as an accessory to clean and to maintain the aesthetics and health of teeth.

OR

A dentifrice is a substance used with a toothbrush for the purpose of cleaning the accessible surfaces of the teeth.

NOTE:

- Dentifrice is the French word for toothpaste.
- Dentifrice is used to promote oral hygiene and most of the cleaning is done by the mechanical use of the toothbrush, not by the toothpaste.

AVAILABLE AS (FORMS)

Paste

Mouth wash

Gel

Powder

FUNCTIONS

- It acts as an abrasive that aids in removing debris, dental plaque and stained pellicle from the teeth and assists in the elimination and/or masking of halitosis.

- Delivers active ingredients such as fluoride or xylitol to help prevent tooth and gum disease (gingivitis).

- They polish teeth to provide increased light reflectance and superior aesthetic appearance.

DENTIFRICE INGREDIENTS

COMPOSITION OF DENTIFRICE

Component	Composition (wt%) Pastes &gels	Powder	Materials	Purpose
Abrasive	20-55%	90-98%	Calcium carbonate/ Dibasic calcium phosphate dihydrate / Hydrated alumina/ Hydrated silica/ Sodium bicarbonate or Mixtures of abrasives	Removal of plaque /stain/ polish tooth surface
Humectant	20-35%	0	Sorbitol, glycerin	maintains moisture content
Water	15-25%	0	Deionized water	Suspension agent

COMPOSITION OF DENTIFRICE Contd..

Component	Composition (wt%) Pastes &gels	Powder	Materials	Purpose
Detergent	1-2%	1-6%	Sodium lauryl sulfate	Aids debris removal
Binder	3%	0	Carragenan	Thickener, prevents liquid-solid separation
Colorants	1-2%	1-2%	Food colorants	Appearance
Flavoring agent	1-2%	1-2%	Oils of spearmint, peppermint, Wintergreen or cinnamon	Flavor

COMPOSITION OF DENTIFRICE Contd. (Therapeutic agents)

Component	Composition (wt%) Pastes &gels	Powder	Materials	Purpose
Fluoride	0-1%	0	Sodium Monofluoro phosphate/ Sodium fluoride/ Stannous fluoride	Prevents dental caries
Tartar control agents	0-1%	0	Disodium pyrophosphate/ Tetra sodium pyrophosphate/ Tetra potassium pyrophosphate	Inhibits formation of calcium above the gingival margin.
Desensitizing agents	0-5%	0	Potassium nitrate, Strontium chloride, Arginine	Promotes occlusion of dentinal tubules.

1. Tooth Powder

- The earliest known reference to a toothpaste is in a manuscript from Egypt in the 4th century B.C, which prescribes a mixture of powdered salt, pepper, mint leaves, and iris flowers.

- In the early 1800s, the toothbrush was usually used only with water.

- soon tooth powders gained popularity in Britain.
Most were home made,
with chalk, pulverized brick,
& salt being common ingredients.

- Toothpaste was first introduced by 1900 and replaced the tooth powder.

Theory

- **Definition:** Tooth powder is a mildly abrasive powder that is used in combination with a toothbrush to maintain oral hygiene.
- The manufacture of tooth powder is a comparatively simple operation.
- The primary objective is the homogenous distribution of all the ingredients without contamination by foreign substances.

•Tooth powder can be prepared by granulating the powders by drying slurries containing the extremely finely divided polishing agent, a detergent and a small amount of a binder.

•The dried product is then comminuted and mixed with flavoring products, the size of the granules of the tooth powders should be such that substantially all are retained on a 100 mesh, but pass though a 40 mesh screen.

•Making of tooth powder is simple and inexpensive, and requires ingredients you probably already have in your home.

COMPONENTS

- Abrasives like phosphate salts , precipitated chalk , silica,etc. for the purpose of cleaning and polishing.
- Detergent is use for the foaming purpose.

- The tooth powder is used in the removal of daily accumulation debris & deposits from the Exposed surface of the teeth, with out causing Injury to the teeth & mucous membrane of the Mouth, it removes stains and odour.
- Tooth powders may contain flavorings such as peppermint, spearmint of cinnamon. These flavorings not only make the tooth powder itself taste better, but also leave the breath sweet smelling and the mouth fresh.

Types Of Tooth Powder

1. Whitening Tooth Powder
2. Natural Tooth Powder
3. Herbal Tooth Powder
4. Homemade Tooth Powder

1. Whitening Tooth Powder:

- Its purpose is to freshen breath, help heal gums and reduce the amount of inflammation in the mouth.

- Tooth powders also can polish and whiten a person's teeth.

2. Natural Tooth Powder

- Ingredients like sea salt, which acts as an abrasive, natural chalk, and certain essential oils like peppermint, eucalyptus, and wintergreen are common ingredients in natural tooth powders.

3. Herbal Tooth Powder

- Sore or bleeding gums also can benefit from herbal tooth powder. Herbal tooth powder can have a variety of ingredients. Baking soda, powdered chalk and white clay are common.

- Herbal tooth powder has been around for centuries, and many believe it to be an essential part of any teeth-cleaning regimen.

4. Homemade Tooth Powder

- These powders also can be made at home.

- Homemade herbal tooth powders can be beneficial because they may cost less and the person making it will know exactly what ingredients he is putting in his mouth or the mouths of his children.

HOMEMADE TOOTH POWDER INGREDIENTS:

- 4 tablespoons bentonite clay
- 2 teaspoons baking soda
- 1 ½ teaspoons finely ground unrefined sea salt
- ½ teaspoons clove powder
- 1 teaspoon ground cinnamon
- 1 ½ teaspoons ground peppermint leaves and spearmint leaves

To use the powder, people measure out a small amount, dip a wet toothbrush into it, and brush their teeth as directed by a dentist.

Uses

- To promote oral hygiene.
- It serves as an abrasive that aids in removing the dental plaque and food from the teeth, assists in suppressing halitosis . It also helps to prevent tooth and gum disease like gingivitis.

Label instruction

- Store in cool & dry place.
- Do not swallow in large amount.
- Keep away from children.
- Stop using if it cause bleeding or sensitization.

Category

* ***Dentifrice***

METHODS OF TEST FOR TOOTH P0WDER

- ✓ Determination of Fineness
- ✓ Determination of Moisture and Volatile matter
- ✓ Determination of pH
- ✓ Determination of Foaming power
- ✓ Test for Lead
- ✓ Test for Arsenic
- ✓ test for Hard and Sharp-edged Abrasive particles

TEST FOR LEAD :

- Outline :
  - The material is brought into solution .
  - The brown colour produced with aq. hydrogen sulphide soln is matced with that produced with std. lead soln.

- Apparatus :
  - Nessler cylinder (100ml)

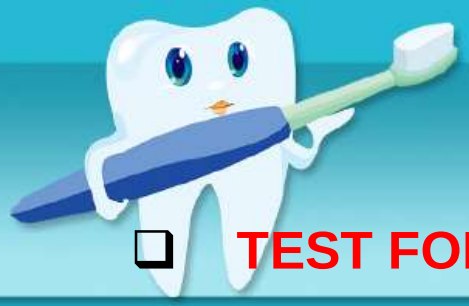
- Reagents :
  - Conc. HNO_3 (IS : 264-1976)
  - Hydrofluoric Acid (40%)
  - Citric Acid
  - Bromophenol Blue Indicator (0.1g bromophenol + 100ml r.spirit)
  - $CuSO_4$
  - HSO_4
  - **Dil.** HNO_3 **(1%)**

Procedure :

- Place 2g of the material in a platinum dish and incinerate for 2hrs at 525º-550ºC
- Add 10ml of conc. nitric acid and heat on a steam bath for 2hrs
- Evaporate off the nitric acid as possible
- Then add 5ml water and again evaporate off to dryness
- Take the residue to fumes on a hot-plate with three successive portions of hydrofluric acid
- this soln is is washed if nessesary , and the soln is used for undear tests

Test 1 :

- Take the 100ml of the above soln.
- add 10g of citric acid, adjust the pH 3.0-3.4 by adding NH_4OH
- Bromophenool blue is used as indicator & gives yellow purple colour
- add 10mg of copper sulphate by passing hydrogen sulphide untill solution is saturated
- Dissolve the sulphides with 5ml of hot dil.nitric acid
- Then the solution is filter into the original flask.
- Boil to remove sulphurated hydrogen
- Add 5g of citric acid previously dissolved in water, adjust the pH b/w 8.5-10 (bluish-green to blue towards thymol blue as indicator)
- Aadd 5ml of KCN and transfer to a Nessler cylinder add 10ml HSO_4 dil. to mark and shake well
- Carry out control test by using 2ml std. Pb soln.



TEST FOR HARD AND SHARP EDGED PARTICLES :

- Procedure :
  - Take 5g of the tooth powder each from the 10 dif. containers.
  - Transfer to ten 50ml beakers
  - Add water drop by drop to form a thick paste in each beakers
  - Spread portions of the paste on a butter paper
  - Testing the paste along the length by finger
  - Observe the presence of hard and sharp edged particles.


100 GM
Dant Manjan
TOOTHPOWDER
दिव्य दन्त मंजन
DIVYA Dant Manjan


Colgate
TOOTHPOWDER
SUPER RAKSHAK
Stronger Healthier Teeth


Cinnamon Stick Tooth Pow
Aquarian Bath
handmade artisan soaps


UNCLE HARRY'S NATURAL PRODUCTS
No Toxic Ingredients
All Natural
TOOTH POWDER
Save Your Teeth & Gums
Net Wt. 2 oz.


peppermint
tooth powder
poudre dentifrice
dental care

2. Toothpastes:

- paste or gel cleaner used to clean and improve the aesthetic or pleasing appearance and health of teeth.

(a) Good toothpaste parameters:

1. Easy to extrude from package
2. Does not run off the toothbrush
3. Holds its shape to a large extend after extrusion
4. Uniform
5. Not overly stringy
6. Disperses readily while the teeth are being brushed
7. Has shiny surface
8. pH of formulation between 4.0-9.0

(b) Toothpaste Formulation

- **General toothpaste formulation composition contains:**

1. Abrasives
2. Detergents
3. Water
4. Humectants
5. Thickening Agents
6. Flavor
7. Sweeteners

(b) Toothpaste Formulation

8. Preservatives
9. Corrosion Inhibitors
10. Colorants
11. Bleaches
12. Anticaries Actives
13. Anticalculus Agents
14. Desensitizing Agents
15. Antimicrobials /antiplaque/ antigengivitis agents

(c)Toothpaste Ingredients

1 . Abrasives:

- The main component responsible for cleaning the teeth.
- Should be abrasive enough to clean the tooth & avoid damage to tooth surface
- Ability depends on particles size, shape, & brittleness of the material
- **EXAMPLES :**

→hydrated silica

→ calcium carbonate,

→calcium pyrophosphate

→ dicalcium phosphate dihydrate

(c)Toothpaste Ingredients

2. Detergents:

- major contributor to teeth cleaning process
- Should be tasteless, nontoxic, nonirritant, producing large volume of non- gagging foam
- **Examples:**

→ Sodium lauryl sulfate (SLS),

→Sodium lauryl sarcosinate

3. Humectants :

- Prevents toothpaste from drying out
- Glycerin (50% aq. solution)
- **EXAMPLES :**

→ Sorbitol

→ hydrogenated starch hydrolysate

→ Propylene glycol, PEG :

disadvantage: ***bitter taste***

→ Xylitol :

Advantage : ***1. sweet & cooliness feeling***

2. anticaries

4. Thickening Agents :

- Needed to maintain the stability of high-solid dispersion
- Affect the dispersibility ,foam character, and mouth feel
- **Examples**:

→Sodium carboxymethylcellulose (interacts with cationic antimicrobials),

→Hydroxypropyl methyl cellulose (HPMC)

→ hydroxyethylcellulose (nonionic),

→Xanthan gum,

→carbomer

5. Flavor :

- Influence consumer acceptance
- Leaves a fresh clean feeling after brushing
- Considered **highest cost** ingredient in the toothpaste formulation

Examples : Peppermint, spearmint, menthol, wintergreen, cinnamon,…

6. Sweeteners :

- Most flavor oils have bitter taste leaving the toothpaste formulation unpalatable without sweeteners
- Artificial sweeteners are used (non cariogenic effect like natural sugar)
- **Examples :**

→Saccharin, sodium saccharin

→ potassium acesulfame

→ Xylitol :

-can't be metabolized by MO of oral cavity

- has great sweetening power

- promotes remineralization of the dental enamel

→ Sorbitol :

- humectant, it has high refractive index so used in transparent toothpaste formulations .

7. Preservatives :

- Rarely used nowadays due to safety concerns
- Proper formulation ingredient selection can result in **preservative free** toothpaste

8. Corrosion inhibitors :

- Used to avoid corrosion of the aluminum tubes (e.g. sodium silicate)
- Not needed nowadays due to the use of plastic tubes

9. Anticaries Actives :

- Fluoride ions reduce the incidence of carious lesion by **reducing** the acid solubility of tooth enamel
- **Examples :**

→Sodium fluoride

→ sodium monofluorophosphate

→ stannous fluoride

- **FDA recommends levels of soluble fluoride ion between 850-1150ppm**

10. Anticalculus Agents :

- **Examples:**

→ zinc chloride,

→zinc citrate (Crest)

→tetrasodium pyrophosphate,

→ disodium pyrophospahe (used more than zinc salts, and it has antiplaque activity)

11. Desensitizing Agent :

- Potassium Nitrate(5%)
- Compatible with fluoride, and has salty taste
- Ex. Sensodyne toothpastes

12. Antibacterial/Antiplaque/antigingivitis

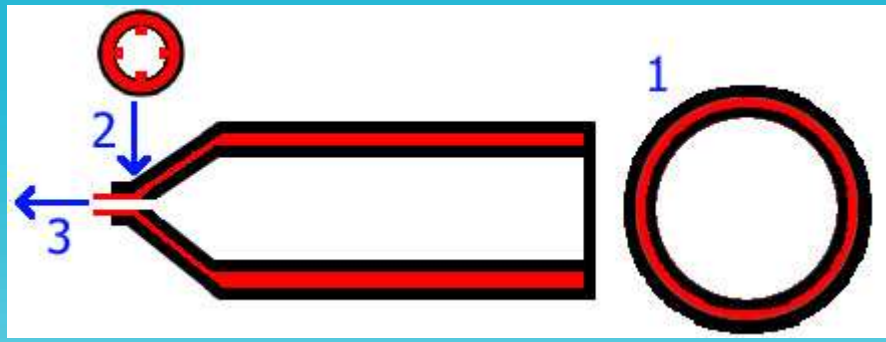
- Triclosan, Chlorhexidine, Zinc citrate.

Striped Toothpaste, How?

- Only for aesthetic purposes
- Two methods for striped toothpaste:
  1) two different colored toothpastes in an unusual type of packaging
  2) Filling the tube with striped paste

1. Double compartment tubes

-more expensive
- reserved for dual action toothpaste, e.g. colgate whitining)
- The collapsible tube has two tanks, and filled with each color paste.
- Squeezing the tube pushes the two pastes out the opening.



2. Striped paste filling :

(less expensive, e.g Aquafresh)

- Filling is done using a multi-nozzle filling head that dispenses a different colored stripe in each direction.

METHODS OF TEST FOR TOOTH PASTE

- ✓ Determination of Fineness
- ✓ Determination of pH
- ✓ Determination of Heavy Metals
- ✓ Determination of Foaming Power
- ✓ Determination of Flouride Ion
- ✓ Abbasivity (RDA) Measurement Test

1) Determination of Fineness :

Apparatus :

- Ultrasonic bath
- Sieves (75 & 150-microns)
- Glass beakers (250ml, 500ml)

Procedure :

i. Determination of Particle Feel on Butter Paper :

- Extrude the paste about 15 to 20cm length each from at least ten collapsible tubes on a butter paper
- Test the paste by pressing it along its entire by a finger for the presence of particles
- The tooth paste suspension should be subjected to an ultrasonic treatment followed by fineness test.

- Detemination of Particle Size on 150-micron IS sieve :
  - Weigh accurately about 20g of the toothpaste, in a 250ml beaker
  - Add 200ml of water & allow to stand for 30min with occational stirring untill the toothpaste is completely dispersed
  - Transfer the beaker in an ultrasonic bath, fill the bath with water about 3/4th height
  - Clamp the beaker in the centre of the centre of the bath keeping about 1cm clearance from the bottom of the bath
  - Subject to ultrasonification for 10min to completely loosen out the constituents
  - Trasfer this suspension to a 150 micron IS Seive & wash by means of a slow steam of running tap water

- Let the water drain out & then dry the seive containing residue in an oven

- If any residue on the sieve, transfer it to a watch glass & dry it in an oven at 105ºC

➢ Calculation :

○ Material retained on 150-micron IS Seive = $\frac{M_1 \times 100}{M}$

M_1 = mass in g of residue retained on the seive,

M = mass in g of the material taken for the test

2) Determination of pH :

- Take 10g of the toothpaste in a 50ml beaker
- Add 10ml of freshly boiled and cooled water (at 27ºC) to make 50 percent Aqu. Suspension
- Stirr to make thorough suspension
- Detrmine the pH of the suspension with in 5 min, using pH meter.

3) Determination of Heavy Metals

- is matched Outline Of the method :
  - The colour produced with thioglycolate reagent in the test soln. against with std. lead soln.
- Apparatus :
  - Nessler cylinder (50ml)
  - Weighing scale (0.0001 g accuracy)
  - Volumetric Flasks (100 ml)
  - Platinum Crucible
  - Pipette (2,10 ml)
- Reagents :
  - Conc. HCl
  - Conc. HNO_3
  - Hydrofluoric acid
  - Dil. CH_3COOH
  - Thioacetamide Reagent
  - Lead Nitrate Stock Soln.
  - Std. Lead Soln.
  - Acetate Buffer

Procedure :

a) Place 2g of the sample in a platinum dish& incinerate for about 2hrs at 525-550ºC

- Cool & add 1-2ml of HCl & o.5ml HNO_3 & evaporate to dryness on the steam bath
- Dissolve the residue in 5 ml hot water, evaporate to dryness & treat it with HCl
- Evaporate to dryness again , dil. With water about 50ml, Filter the soln.
- Dil. The filtrate & washing to 100ml graduated flask
- This soln. is used as test soln.
- This test shall be used for the determination of arsenic also.

b) Trasfer 25 ml of test soln.(prepared above) in 50 ml of Nessler cylinder

- Add further 2 ml of test soln. & 2 ml of acetate buffer (pH 3.5) & mix well
- Add 1.2 ml of thioacetamide reagent,mix, & immediately dilute with water to 50 ml & allow to stand for 2 min

c) In the second Nessler cylinder, place 1ml std. lead soln. & 2ml of test soln.

- Dilute with water to 25ml , & add 2ml of Acetate buffer
- Mix & add 1.2ml thioacetamide , & dilute with water to 50ml
- Allow to stand for 2min
- Compare the colour produced in two Nessler cylinders.

Control test :

- The intensity of colour produced in the test solution is shall not be greater than that produced in the second Nessler cylinder

4) Determination of Arsenic :

- Out line :
  - Arsenic is reduced to arsine, it react with mercuric bromide paper,
  - The stain is compared with std. stain.

- Reagents :
  - Mixed acid (1 vol of conc. H_2SO_4 & 4 vol of water,10g of NaCl)
  - Ferric Ammonium Sulphate Solution (64g $FeNH_2SO_4$, 10ml of Mixed acid)
  - Conc. HCl
  - Stannous Chloride Soln.

- Procedure : (IS 2088)

  - In Gutzeit bottle , 2ml of $FeNH_2SO_4$ soln., 0.5ml of stannous chloride solution & 25 ml of sample soln. (As prepared in 3a)

  - For comparison, prepare a stain using 0.001mg of AsO_3

5. Determination of Foaming Power

- Outline :

  A suspension of the material in water is taken in a graduated cylinder

  The volume of the foam formed is observed after keeping the cylinder for 5min

- Apparatus :

  Graduated cylinder (100ml,250ml)

  Thermometer (o-110ºC)

- Procedure :

a) 5g of toothpaste in 100ml glass beaker, add 10ml of water, cover the beaker with a watch glass & allow to stand for 30min(for dispersion).

b) Stirr the contents of beaker with a glass rod & transfer the slurry to the 250ml graduated cylinder, ensuring that no foam (>2ml) produced Add 5 to 6 ml of water , ensuring that all the matter in the beaker is transferred to the cylinder.

c) Adjust the contents in the cylinder to 50ml by adding sufficient water

Adjust contents of cylinder to 30ºc, stirr the contents of cylinder with a glass rod

d) The temp. of the contents of the cylinder reaches 30ºC, stop the cylinder & give 12 comprising shakes, each shake comprising down

After completing the 12 shakes, allow the cylinder to stand for 5min & measure the vol of foam

- Calculation :

$$\text{Foaming power, ml} = V_1 - V_2$$

V_1 = foam plus water

V_2 = water

5. Determination of fluoride ion :

- For the determination of water soluble fluorides present in toothpaste
  eg : Sodium monofluorophosphate

❑ Principle :
- Convertion of water soluble fluoride into fluoride ion by acid hydrolysis
- Fluoride ion activity is determined potentiometrically(Fluoride ion sensitive electrode)

❑ Apparatus :
- pHMeter (Potentiometer)
- Fluoride ion sensitive electrode
- Single junction Reference electrode
- Magnetic stirrer

❑ Reagents :
- Sodium Fluoride
- Trisodium Citrate
- Sodium chloride
- Hydrochloric acid (1M)
- Sodium Hydroxide (1M)
- Sodium Acetate trihydrate
- Glacial Acetic Acid

- TISAB L (Total Ionic Strength Adjusting Buffer) Solution :
  - Dissolve 294g trisodium citrate, 29g NaCl & 68g Sodium acetate trihydrate in 600 ml of hot water
  - Cool adjust pH 6.4 with glacial acetic acid
  - Diluted to 1 lit with distilled water
- TISAB LF (TISAB Containing Fluoride soln.) :
  - Take 100ml of TISAB solution
  - From the above soln. pipette in 10ml of 1mg F/100ml soln.
  - Adjust the pH 6.4 with Glacial Acetic Acid, dilute to 1 lit with distilled water.
  - Store in a polythene or polypropylene bottle

- Fluoride Blank Solution :

  - Take 100ml of HCl(1M) solution in 1 lit. flask, add 200ml of NaOH (1M)
  - Dilute to 1 lit. with dis. Water

- Standard Sodium Fluoride Solution :
- Solution-x :

  - Dry the NaF at 110ºC for 4 hrs
  - Transfer about 0.222 gm to 100 ml volumetric flask
  - Add distilled water to dissolve the NaF and make up to the mark
  - Solution- x contains 1mg chloride ion

- Solution – Y :

  - Take 1O ml of Soln-X in 1000ml vol.flask make up this vol. to the mark
  - Each ml of soln-Y contains 0.01 mg fluoride ion
  - Transfer the soln-X and soln-Y to polythene bottles for storing

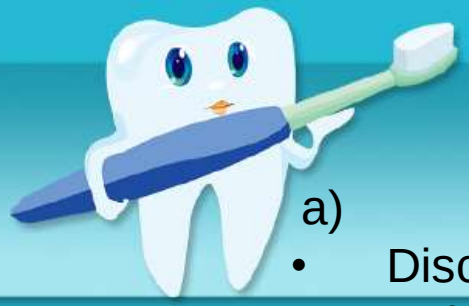
Preparation of satndard Solutions of Sodium Fluoride :

- Take 1, 2, 5, 10, 20, and 25 ml of Solution-Y in 100ml volumetric flask marked A, B, C, D, E and F respectively
- To each add 50 ml of fluoride blank solution (pH range 6.4±0.1)
- Transfer quantitatively to a 100 ml polypropylene volumetric flask
- Maku up the volume to 100 ml with dis. Water

Solutions	F per 100 ml
A	0.01 mg
B	0.02 mg
C	0.05 mg
D `	0.1 mg
E	0.2 mg
F	0.25 mg

Preparation of Electrodes :

Remove protective cap and soak the fluoride electrode in TISAB LF Solution for 15 min.



TEST SOLUTION :

a)

- Discard the first 5 cm of paste extruded from the tube and then weigh about 5g tooth paste
- Add approximately 30 ml hot deionized water (90-95ºC)
- Slurry the paste with a micro spatula after addition of water
- allow to cool dilute to 100 ml in a polypropylene volumetric flask and mix well

b)

- From the above , Centrifuge about 60ml of the dispersion in a polypropylene centrifuge tube
- Closed with a cap to prevent evaporation, untill clear
- This will take about 20min at 4000 rpm

c)

- Pipette 20 ml of the clear supernatant into a 250 ml r.b.flask

d)

- Add a few bumping granules then add 10 ml HCl soln.(1M)
- Attach a reflux condenser and boil jently for 5 min

e)

- Add immediately 20 ml of NaOH through the condenser, rincing 20 ml of dis. Water
- Then transfer to a 100 ml polypropylene volumetric flask & make up the volume with dis. water

f)

- Pipette 25 ml of the clear soln. from the above 100ml soln.
- Add 25 ml TISAB L (solution L) & pH is adjusted to 6.4 by the addition of 1M HCl or 1M NaOH
- Trasfer into a 100 ml volumetric flask & make up the volume

g)

- Transfer the contents of flask to a clean, dry polythene beaker
- Immerse the tips of the electrode in the soln.
- while stirring the soln. with a magnetic stirrer , no air bubbles adhere to eletrode surfaces

h)

Allow untill the potential reading is constant (2-3 min)
Record the potential reading in mV for the test soln.

- The reading for standard fluoride and test solutions shuld be taken simultaneously. Graph is plotted for Conc. of F^- Vs potential mV.

- Calculation :

$$= \frac{2a \times 10\,000}{M}$$

Conc. of F^- in toothpaste,
parts per million

Where

a = mg of F^- from calibration graph for test soln.

M = Mass of sample in g.

3. Mouthwashes:

- or mouth rinse
- Antiseptic and anti-plaque mouth rinse claims to kill the germs that cause plaque, gingivitis, and bad breath.
- Anti-cavity mouth rinse uses **fluoride** to protect against tooth decay.
- The use of mouthwash does not eliminate the need for both brushing and flossing.

Mouthwash Ingredients

(large overlap in ingredients used in toothpaste):

1. **Solvents :**
   - Water: deionized, or distilled to avoid interaction with other components
   - Ethanol: good solubilizer and freshness effect
2. **Flavor:**
   - main function for a mouthwash is to leave a nice fresh feeling
3. **Phenolics** :
   - Kill germs that cause bad breath and plaque
   - thymol, eucalyptol, menthol

4. Humectants :

- Aid in solubilization of flavor, add sweetness, and **increase osmotic pressure** (hence decrease the risk of microbial growth)

5. Solubilizer/emulsifier :

- Help maintain clear end product
- Poloxamer, polysorbates

6. Antimicrobial:

- Cetyl pyridinium chloride (CPC), Chlorhexidinemain function for a mouthwash is to leave a nice fresh feeling

7. Buffers :

- Maintain suitable pH
- Benzoic acid, sodium benzoate, sodium phosphate

References

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- Allured's Cosmetics &Toiletries.2000. 115: 5, pp 49-53
- The free encyclopedia (www.wikipedia.com)

THANK YOU