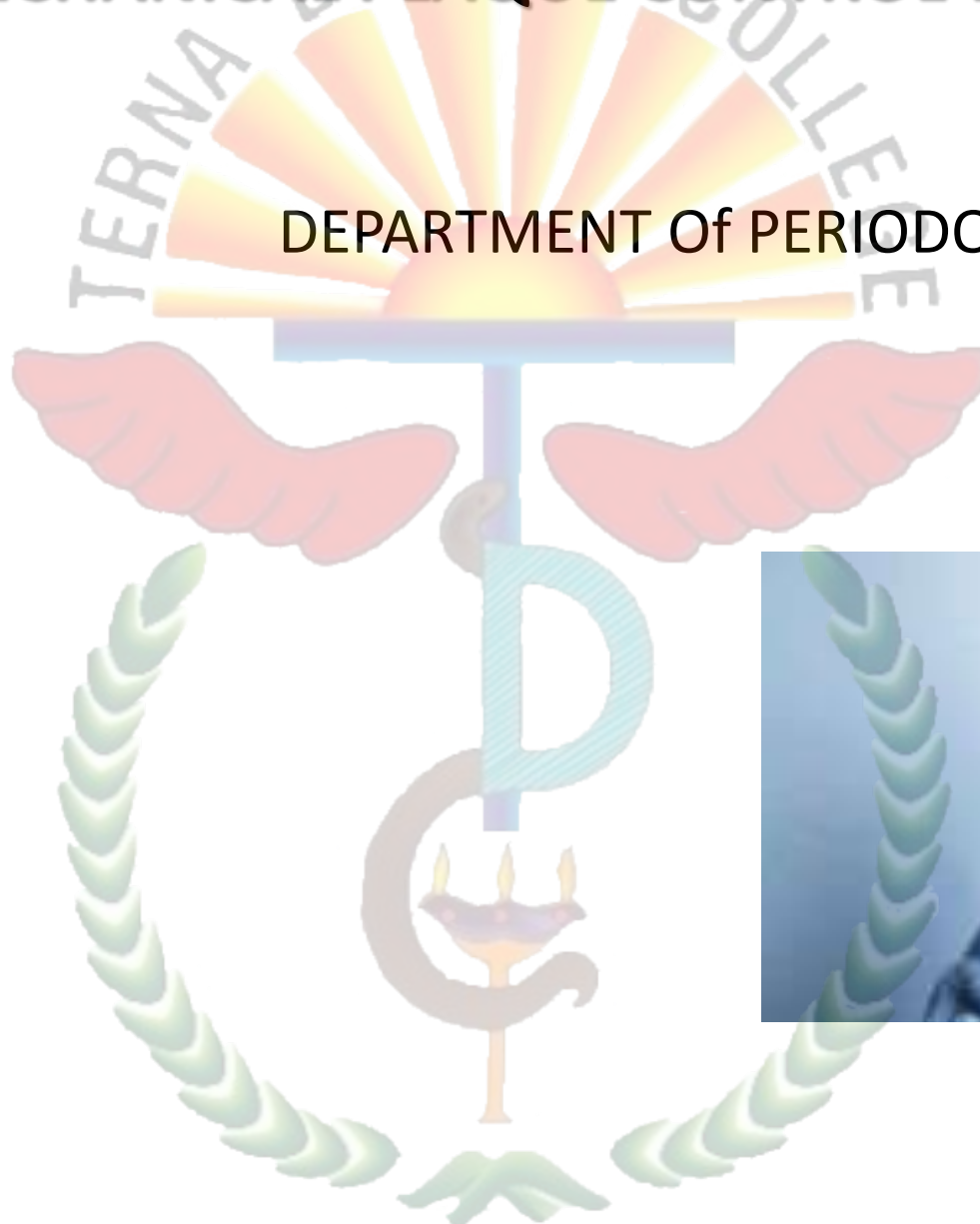


T.P.C.T.'S

MECHANICAL PLAQUE CONTROL-2

DEPARTMENT OF PERIODONTOLOGY



CONTENTS

- OBJECTIVES
- CONTENTS
 - COMPOSITION OF DENTIFRICE
 - INTERDENTAL CLEANSING AIDS
 - DISCLOSING AGENTS
- TAKE HOME MESSAGE
- CONCLUSION



LEARNING OBJECTIVE

- To understand the composition of dentifrices, classification of interdental aids, disclosing agents.





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INTRODUCTION



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DENTIFRICES



• Def:-

A dentifrice is a substance used with a toothbrush or other applicator to remove bacterial plaque, materia alba & debris from gingiva & tooth, for cosmetic & sanitary purposes & for applying specific agents to the tooth surfaces for preventive & for therapeutic purposes.

- Addition of abrasives facilitates plaque & stain removal.

knitz et al '97)



❑ In 1824, dentist *Peabody* was first to add soap to toothpaste.

❑ *John Harris* first added chalk as an ingredient to toothpaste in the 1850s.

❑ Colgate mass-produced the first toothpaste in 1879.



- ❑ The studies by *de la Rosa and co-workers (1979)* and *Stean and Forward (1980)* validated the use of dentifrice...



- Development of fluoride toothpastes
 - *Bibby (1942): first clinical trial of fluoride toothpaste.*
 - *Muhler et al (1954) used newly developed Ca- pyrophosphate abrasive system*



gate Palmolive Company marketed sodium lauroyl

sarcosinate dentifrice

- Triclosan...formulated into a dentifrice in combination with co-polymer / Zn citrate. (*Lindhe et al'93*)
- Daily use of triclosan... have some effect on progression of periodontitis (*Rosling et al '97*)



Constituent	Concentration (%)
Abrasive	20 - 50
Water	20 - 40
Humectants	20 - 35
Detergent	1 - 3
Thickening agent	1 - 2
Flavoring agent	0 - 2
Sweetening agent	0 - 2
Therapeutic agent	0 - 2
Coloring or preservative	0.05 - 0.5



□ ABRASIVE-POLISHING AGENTS:-

- 1) Calcium carbonate
- 2) Calcium phosphate
- 3) Sodium phosphate

Modern abrasive → silica, alumina & aluminium hydroxide
are very hard substances...



□ **ABRASIVE :-**

Purpose

- Cleaning / stain removal
- Cleaning effect of one is combined with polishing effect of another to give the best result.
- Cleaning power of abrasive depends on:
 - *type and amount of abrasive particles*
 - *surface it contacts*
 - *dilution by saliva*
 - *brushing pressure / individual*
- *E.g. → Silica / hydrated silica, Brushite, Gibbsite*





□ **Water:-**

Purpose –

□ **Dissolves ingredients allowing them to be mixed.**

solvent



□ HUMECTANTS:-

Purpose –

□ Moisturizing agent

□ Protect toothpaste from drying up during storage

ovides smooth creamy texture



☐ DETERGENT/ SURFACTANT:-

Purpose –

- ☐ Surface-active substances
- ☐ Decrease surface tension
- ☐ Penetrate and loosen debris

nulsify and remove debris along with the
aming
othpaste



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❑ THICKENING AGENT/ BINDING AGENT:-

Purpose –

- ❑ Control viscosity
- ❑ Hold the toothpaste ingredients together
- ❑ Keep the creamy consistency during storage

g. → *Xanthum gum, Carboxymethylcellulose, Irrageenan*





FLAVORING AGENT:-

Purpose –

- Provide flavor



E.g. → Regular flavor = wintergreen



THERAPEUTIC AGENTS:-

Purpose –

- In general:
 - reduce caries
 - antimicrobial
 - inhibit tartar formation
 - desensitization
 - anti-inflammatory

E.g. → Fluoride, Triclosan, Metal ions, Sanguinarine, Surface-active subst, Chlorhexidine





□ COLORING/ PRESERVATIVE:-

Purpose –

- Colorants
- Titanium Dioxide = makes toothpaste opaque.



FLUORIDES IN TOOTHPASTE

- *The first therapeutic addition to the basic dentifrice...*

➤ Stannous fluoride (SnF_2)

odium monofluorophosphate (Na MFP)

odium fluoride (NaF)



TYPES OF FLUORIDE IN TOOTHPASTES

□ SnF_2 :

- ↑ incidence of staining
- Staining found in thick pellicle present or the porous enamel of incipient lesions.

□ MFP and NaF :

□ widely used for dentifrices



❑ **ADA COUNCIL ON DENTAL THERAPEUTICS:-**

➤ **Group A:- Accepted Dental Therapeutics**

- accepted products that may use the seal of acceptance as well as an authorized statement about their therapeutic effectiveness → have adequate evidence of safety & effectiveness

➤ **Group B:- Provisionally accepted**

- products meeting the councils standards & showing reasonable usefulness & safety but lacking sufficient clinical evidence to prove therapeutic effectiveness





➤ Group C:-

- Products unevaluated due to limited evidence of effectiveness or usefulness, making accurate evaluation impossible

Group D:- Unacceptable products



INTERDENTAL CLEANING AIDS

- ❑ Any toothbrush regardless of the brushing method used, does not completely remove interdental plaque.
- ❑ Daily interdental plaque removal is crucial to augment the effects of toothbrushing...



Many tools are available for interproximal...

❑ Many surveys suggest that interdental cleaning appears to be one of the prime areas of neglect. Dental flossing has been shown...but it is not popular.

❑ Nixon surveyed the interdental cleaning habits of 766 patients of Brisbane dental hospital in Australia. Only 11.5% practiced interdental cleaning...



□ Barton & Abelson 1987 reported that the use of interdental wooden tooth picks improved interdental cleaning by over 50%, whereas toothbrushing alone resulted in only an 8%...

□ Mauriello et al 1987 evaluated three interproximal cleaning aids as adjuncts to toothbrushing ... all of the adjuncts removed significantly more plaque than toothbrushing ne.



DENTAL FLOSS

- ❑ Dental floss is the most widely recommended tool for removing plaque from proximal tooth surfaces.

Gjeramo et al 1969

- ❑ When properly used, flossing effectively removes up to 80% of proximal plaque.

- ❑ Even subgingival plaque can be removed, since dental floss can be introduced 2-3.5 mm below the tip of the papilla.
(*Waerhaug 1981*).



❖ **Levi Spear Parmly ...**

□ **Different types of materials – nylon**

- **Twisted and non twisted**
- **Bonded and non bonded**
- **Waxed and non waxed**
- **Thick or thin**
- **Microfilament and multifilament**

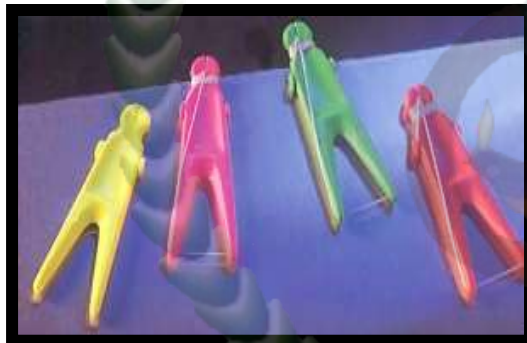


USE OF FLOSS

1) Conventional method



2) Using floss holder



POWERED FLOSS



- A single bristle that moves in a circular motion
- 10,000 gentle strokes / min
- Safe & effective, but no better at plaque removal than finger flossing (*Cronin et al'96*)



indications

• Requiring manual dexterity

SUPER FLOSS

- It is ideal for cleaning braces, bridges, wide gap between teeth.
- It has three basic components, a stiffened end, spongy floss, and regular floss
- Stiffened threader so you can floss under appliances.
- Spongy floss cleans around appliances and between wide spaces.
- Regular floss removes plaque under gum line.



TOOTH PICKS

- ❑ Toothpicks are an excellent substitute to dental floss for interproximal open spaces (*Bergenholtz et al 1980*).
- ❑ Toothpicks are usually made of soft wood and have a triangular shape.... (*Mandel 1990*).
- ❑ Wooden toothpicks are used either with or without handle.



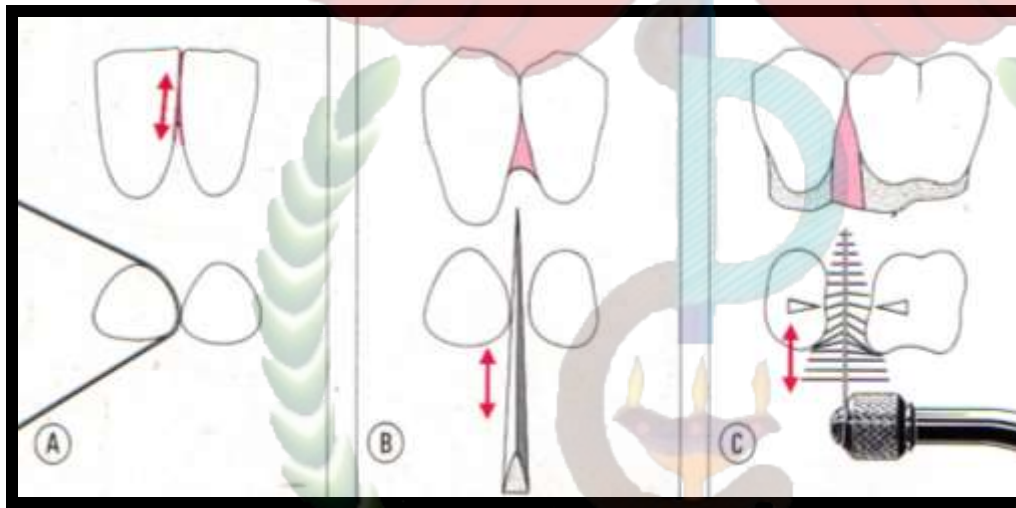
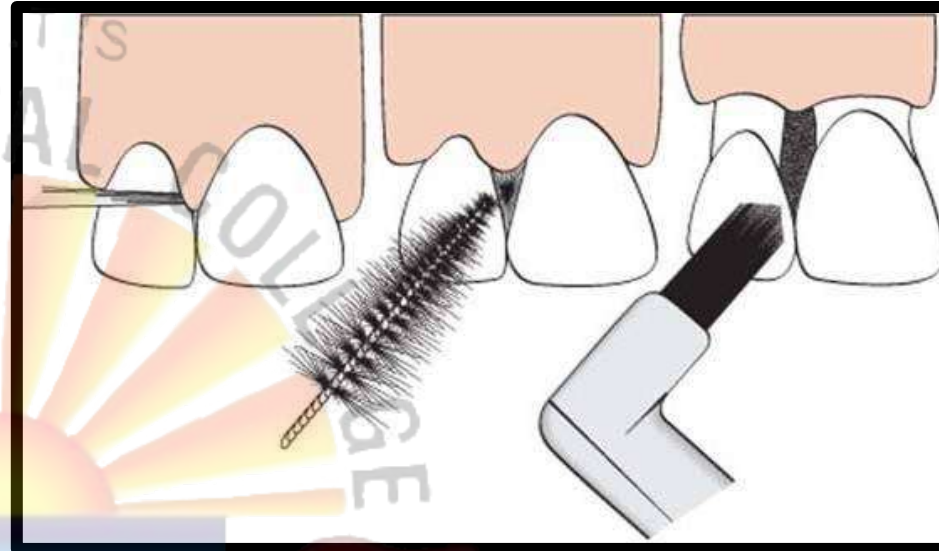
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- **Wooden toothpicks used with handle improve access to all areas... than floss in reducing plaque and bleeding scores in subjects with gingivitis.**

Lewi et al., Journal of Periodontal 2004

- 1 **Rubber and plastic tips are also available.**



INTERDENTAL AREAS CLASSIFICATION



SITUATION

1. Intact interdental papillae; Narrow interdental space
2. Moderate papillary recession; slightly open space
3. Complete loss of papillae, wide open interdental space
4. Wide embrasure space; diastema, anterior or posterior surface of most molar, root concavities or grooves

- Dental floss or small woodstick

- Dental floss, wooden stick

- or small interdental brush

- Interdental brush...





INTERPROXIMAL BRUSHES

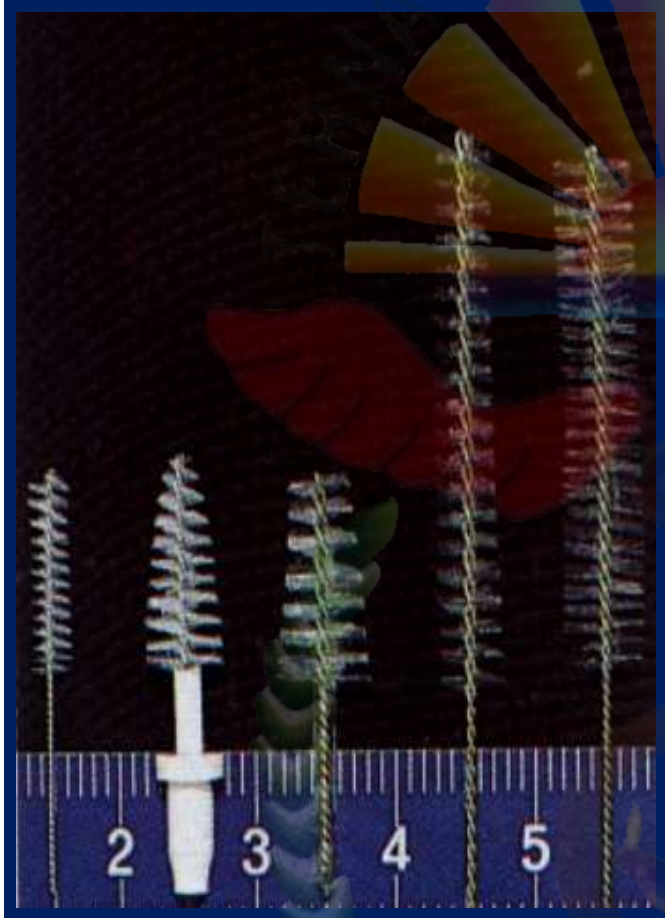
- Interproximal brushes are also effective in the removal of plaque from the proximal tooth surfaces

(Bergenholtz et al'84)

- Different sizes and forms...
- Small brushes can be inserted into handles → facilitate the cleaning of interproximal areas in the post. parts of the dentition.

the aid of choice when exposed root surfaces have cavities or grooves.





UNITUFTED BRUSH

- In furcations
- Isolated areas of recession
- Lingual surface of lower teeth...



END TUFTED BRUSH

- Is perfect for cleaning specific, difficult to reach areas, between crowns, bridgework and crowded teeth.
- End rounded bristles gently remove plaque.
- Dual-angled head allows to pinpoint hard to reach areas.



RUBBER TIP STIMULATOR

- Is recommended by dentists to clean, stimulate, and massage the gums.
- Dual angled head will help to...



causes epithelial thickening...





OTHER INTERDENTAL AIDS

- Knitting yarn
 - Used for wide interdental spaces.
 - Only synthetic yarn should be used.
 - It is 8 inches yarn.
 - Okullo 1998 says that it is good as floss.

cleaner
prevents severe loss of interdental tissue.



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- Gauze strips

vab tips



ORAL IRRIGATION DEVICES



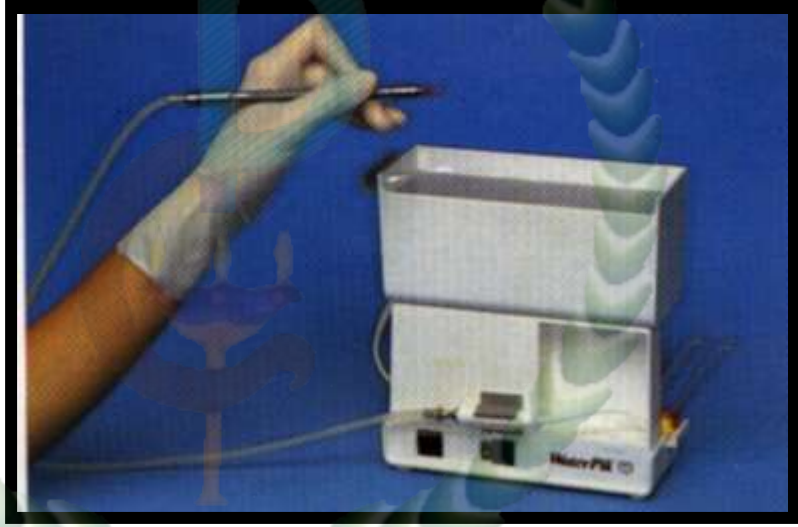
- Oral irrigators clean non adherent bacteria & debris from oral cavity more effectively.

- MOA:- *by directing a high pressure, steady or pulsating*

*stream of water through a nozzle to the
oth surfaces..*

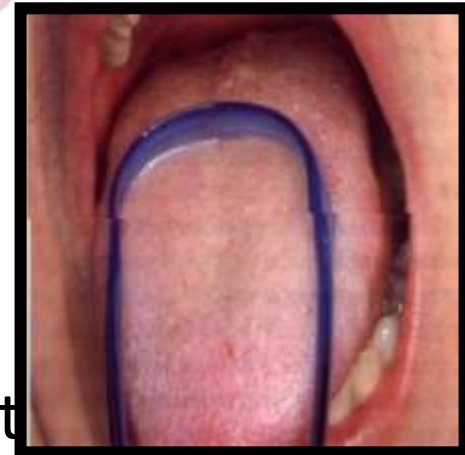


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TONGUE CLEANER

- Dual brush
- Tongue scrapers
- A variety of tongue cleaners with different shapes and sizes are available and are said to be more effective than regular toothbrush..(Christensen et al'98)



GUM MASSAGE

- Can be done by toothbrush or interdental cleaning aids...
- It increase keratinization
- It increase nutrition to the tissues
- It increase vascularity
- Epithelial thickening, increased keratinization...have not been shown to be beneficial in maintaining gingival health.

Glickman Journal of periodontology 1965



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DISCLOSING AGENTS



DISCLOSING AGENTS



- Def:-

- These *are* solutions and wafers capable of staining bacterial deposits on the surfaces of teeth ,tongue and gingiva. (*Carranza 10th edition*)

- *Raybin (1943)* defined a disclosing solution as “ A solution which when applied on teeth, makes visible by staining roughness and foreign matter on the teeth”.



- *Skinner in 1914* described the use of disclosing agent to teach home care of the mouth.

- Skinner has mentioned that to prevent Pyorrhea and dental caries , teeth had to be esthetically more clean.

concluded that they are excellent

..,giene aides



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- In *1920 Berwick* used dye combination of Green and crystal violet.
- In *1943 Raybin* used Gentian violet.



- *Arnim (1963)* initiated use of erythrosine dye as a disclosing agent.
- Disclosing agent is preparation in liquid, tablet that contain dye or other coloring agent.



can be used to identify bacterial plaque
deposits for
instructions, evaluation of oral hygiene.

- Bacterial plaque is readily colorless unless stained by food beverages or tobacco.
- After the use of disclosing agent soft deposits pick up color of the agent, Where as dye agent can be readily rinsed off from plaque free area.



□ **Purpose:-**

- **Disclosing agent** clearly demarcates soft deposits that otherwise invisible and thus facilitates –

A) Personalized patient instruction in the location of soft deposits and technique for removal.

Self evaluation of patient on daily basis



PROPERTIES OF IDEAL DISCLOSING AGENTS

1) Intensity of the color -

- Distinct staining of deposit should be evident.
- The color should contrast with normal colors of oral cavity.

2) Duration of intensity –

- The color should not rinse off immediately with ordinary rinsing method or removed by saliva for period of time required.
- It is equally important that desired color to be removed after complete instructions.



3)Taste-

- The patient should not be uncomfortable by an unpleasant or highly flavored substances.
- The use of the agent should be pleasant & encouraging.

4)Irritation to the mucous membrane –

- Possibility of Allergy with different type of disclosing agents ,so ideal disclosing agent should not have any side effects.



5) Diffusibility –

- Solution should be thin enough so that it can be applied readily to the exposed surfaces of teeth.
- And also thick enough to impart an intense color to bacterial plaque.



6)Anti-septic properties-

- In plaque research studies anti- septic disclosing agent should be used.. (dual purpose)

➤ Different formulae –

- ❑ A wide variety of disclosing agents are used
- ❑ Skinnners iodine solution was most widely used
- ❑ Aniline dyes have been shown carcinogenic potential. So use of basic fuchsin and Beta rose (flavored basic fuchsin) are questionable



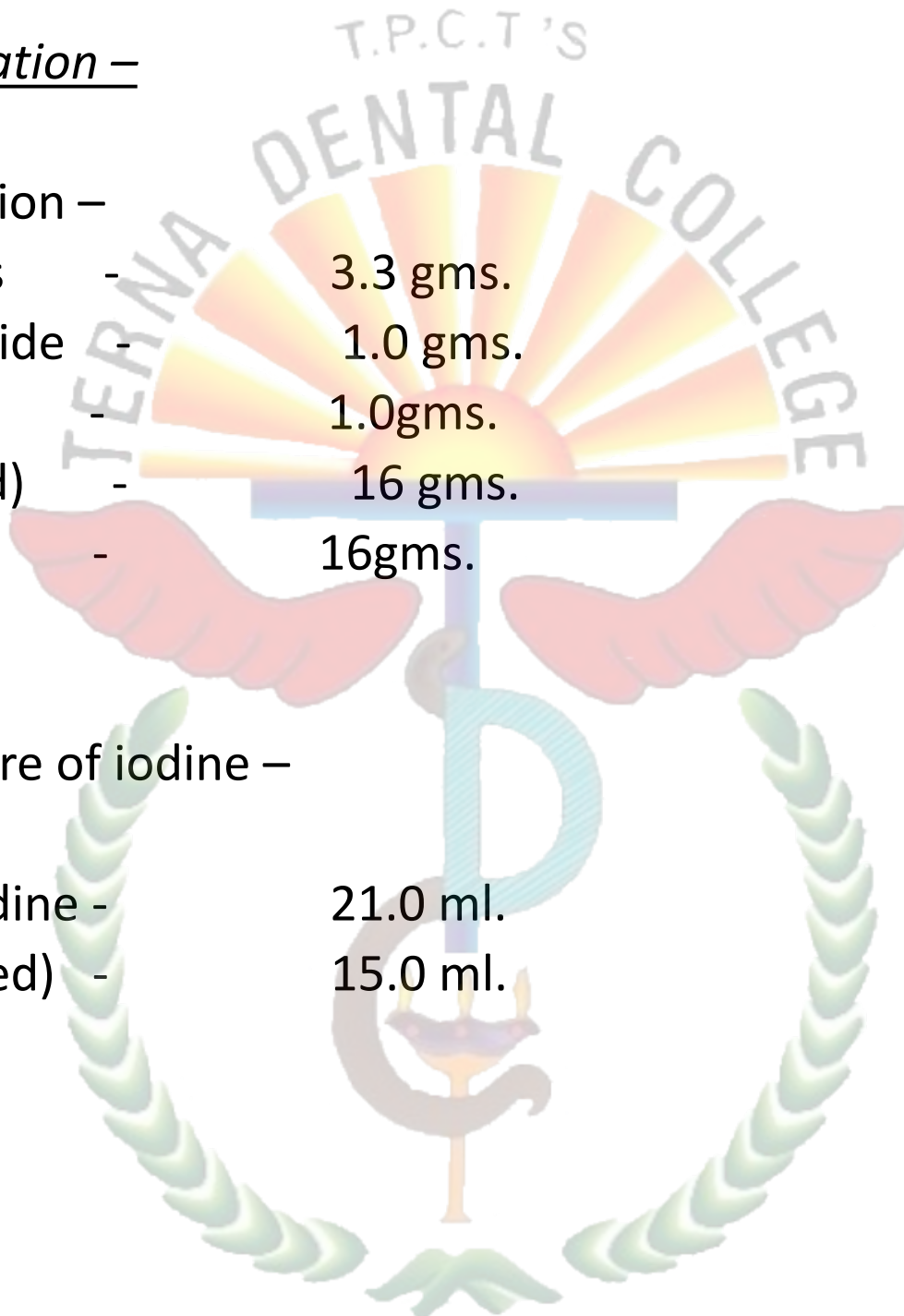
A. Iodine preparation –

➤ Skinners solution –

- Iodine crystals - 3.3 gms.
- Potassium iodide - 1.0 gms.
- Zinc iodide - 1.0gms.
- Water (diluted) - 16 gms.
- Glycerin - 16gms.

➤ Diluted Tincture of iodine –

- Tincture of iodine - 21.0 ml.
- Water (distilled) - 15.0 ml.



➤ Advantages of iodine based solutions –

- ❑ Plaque can be stained deeply brown and black.
- ❑ Discoloration in fact disappears in few minutes, very useful in clinical photography.

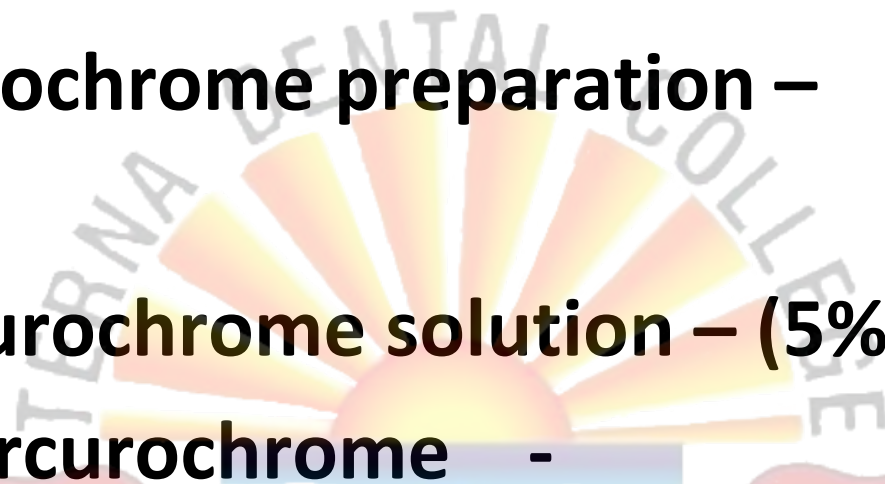
- ❑ Low cost.

➤ Disadvantage -

- ❑ Allergy to iodine

acceptable taste.





B. Mercurochrome preparation –

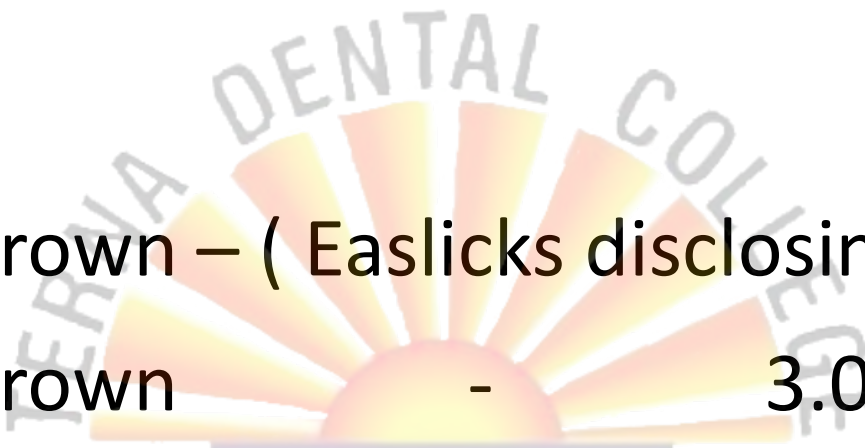
1) Mercurochrome solution – (5%)

- Mercurochrome - 1.5%
- Water (Distilled) - 30ml

Flavored mercurochrome disclosing solution –

- Mercurochrome - 13.5





C. Bismark Brown – (Easlicks disclosing solution)

- Bismark Brown - 3.0 gms.
- Ethyl alcohol - 10.0 ml.
- Glycerin - 120.0ml.
- Anise (Flavouring agent) - 1 drop.

D. Merbromin

- Merbromin NF - 450 mg.
- Peppermint oil - 1 drop.
- Distilled water - 100 ml.



E.Erythrosine –

1) concentration for application by rinsing-

- F.D. C. Red no. 3 or no. 28 - 6.0 gms.
- Water - 100 ml.

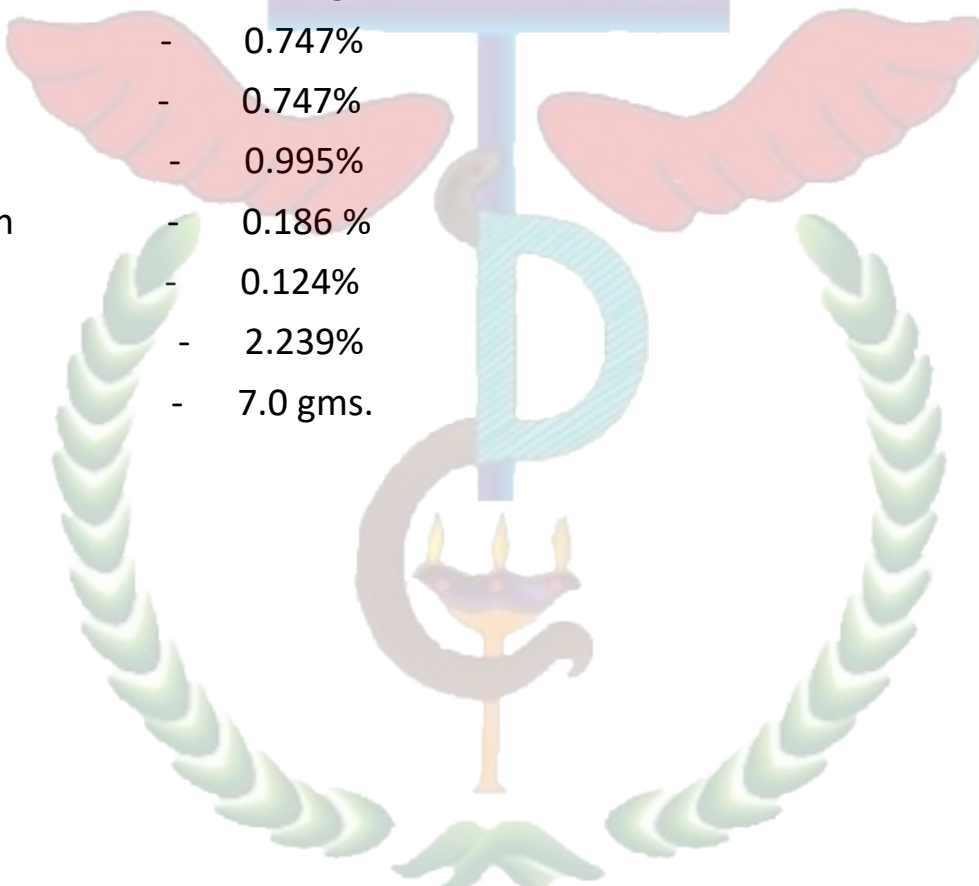
2) For direct topical application –

- Erythrosine - 0.8 gms.
- Water (distilled) 100 ml.
- Alcohol (95%) 10.0 ml.
- of peppermint 2 drops



3. Tablets and Wafers –

- F.D.C. Red no. 3 - 15.0 mg.
- Sodium Chloride - 0.747%
- Sodium Sucaryl - 0.747%
- Calcium stearate - 0.995%
- Soluble Saccharin - 0.186 %
- White oil - 0.124%
- Flavouring agent - 2.239%
- Sorbitol - 7.0 gms.



F.Fast Green -

- F.D. C. Green No.3 - 5%

➤ Advantages of Erythrosine -

- It fades in brief time.
- Does not discolor composite type of restoration.
- Does not permanently stain clothing or dental equipment.
- Does not have any known possible adverse side effects which iodine or mercury stains may have.



G.Two tone solutions –

- F.D.& C. Green no: 3
- F.D.& C. Red no: 3
- E.g. → Alpha-Pac. (DPI), Plaque-C.(ICPA)
- Thicker older plaque stains blue.



Thinner plaque (newer) plaque stains Reterna
pink

H. Basic fuchsin :

6 gms.

- Ethyl alcohol (95%) 100 ml.
- Add two drops of solution in to water.
- In 1962 Quigley and Hein used basic fuchsin mouth wash as disclosing agent for measurement of plaque. (Quigley-Hein plaque index.)



➤ Gingival tissue evaluation should be done before application because disclosing agent will mask tissue colors.

A) Solution for direct application –

- ❑ Dry the teeth with air , retract cheek and tongue.
- ❑ Use small cotton pellet to carry solution to teeth.
- ❑ Apply solution to crown of the teeth only.
- ❑ Examine the distribution of the agent and request patient to rinse if indicated.



B) Rinsing –

- A few drops of concentrated preparation should be added in water for the appropriate dilution.
- Instruct the patient to rinse and swish the solution over all the tooth surfaces.

C) Tablets and wafer –

- Patients should chew the wafer and tablet.
- Swish it around for 30 to 60 seconds and then rinse.



- Effect -:
- Clean tooth surface do not absorb the colouring agent or dye.
- When pellicle & bacterial plaque are present, they absorb the agent & are disclosed.
- Pellicle stains as thin, relatively clear covering & plaque appears darker , thicker & more opaque.
- The oral mucus membrane & lips may retain the color from certain disclosing agent so application of petroleum gelly is advisable.



MECHANISM OF ACTION

- MOA of two tone plaque:-
- Disclosing solutions which differentiate between new and old plaque have distinct advantage.
- A Two- tone dye solution developed by *Block & Lobene, Derdivanis* contains dyes F.D. C. Red no. 3.
- Green no.3 which effectively color old plaque blue or blue-purple & new plaque red or pink.
- The property of the disclosing solution was suggested to be the two-tone dye would prove helpful in investigating bacteriological & biochemical diff...



- IN - VITRO – (Gallagher et al)
- The chemical properties of diluted Dis-plaque (two- tone) were examined.
- Acidification to PH 1 produced green color, alkali at PH 14 had no effect on hue.
- When 1 ml. of 20 volume H₂O₂ was added to 1 ml of diluted Dis-plaque the blue was bleached slightly.
- The addition of Alkali (0.5 - 2ml.) of 0.1 NAOH to the dye – H₂O₂ mixture produced a pink color after several minutes.
- Both Alkali and H₂O₂ are metabolites of dental plaque, but it seems unlikely that these would produce a quick color change with Dis plaque.



- Further investigation indicated that a simpler physical process could account for the activity of the two- tone dye.
- IN VIVO –
- Blue purple stained plaque on teeth slowly lost the blue color on continued rinsing.
- Heavy plaque which had accumulated on teeth surfaces stained dark blue purple.
- This thick plaque from tooth surface was scrapped off and observed under microscope slides.
- After brief washing thin portions of plaque lost their blue purple color leaving pink color (Red no. 3.)



- Thick parts of the plaque retained original hue.
- These results demonstrated that the staining was thickness dependent and not associated with bacterial and biochemical factors.
- *Arnim (1963)* initiated use of erythrosine dye as a disclosing agent. He used F.D.C. Red no. 3 erythrosine dye in water as a disclosing agent.
- *Begue & Bard , Koehne (1966)* used F.D.& C Red no.3 and reported that it inhibits oral microorganisms. (especially gram +ve)



CONCLUSION

Understand the importance of disclosing agents, different interdental cleansing aids.

Understanding the different techniques and types of brushes which can be prescribed to the patients.

Understand the brushing techniques.

Used proper mechanical plaque control and to improve oral hygiene patients.

TAKE HOME MESSAGE

- Understand the importance of disclosing agents, different interdental cleansing aids.



PROBABLE SAQS AND LAQS

- **disclosing agents**
- **classify interdental aids**

