Toothpaste

Toothpaste

- Includes pastes (opaque) and gels (translucent)
- Differ from products such as fluoride gels because they contain added ingredients that assist in plaque and stain removal during brushing

Determinants of Long-Term Health

- Access to good health care
  - Competent dental professionals
  - Sufficient number dental professionals
  - Distribution dental professionals
  - Preventive focus
- Environment
  - Economy
  - Education
  - Environmental policy
  - Health systems
  - Social systems
  - Access to oral health products
- Personal beliefs and behaviour
  - Toothbrushing
  - Toothpastes

Evolution of Toothpaste – Evolved Separately to Toothbrushing

- Egyptians made tooth powders from 5000BC
- 1873 first mass produced toothpaste (jars)
- 1892 first toothpaste in collapsible tubes (Dr Sheffields Creme Dentifrice – USA)
- Sheffield's company later becomes Colgate
- Fluoride added in 1950s – approved by AmDA Council on Dental Therapeutics 1960
- Present day – added benefits (desensitising, whitening, xerostomia-relief, multi-benefit)

Toothpaste Ingredients

- 20-35% Water
- 20-40% Humectant – keeps paste moist
- 5-50% Abrasives – remove stain and plaque and polish teeth
- 1-3% Detergents – reduce surface tension, enhance cleaning, loosen food particles
- 1-3% Flavours – fresh, clean taste and after-taste – no Colgate toothpaste contains sugar
- 1-2% Colouring, Binders (stabilise and hold ingredients together), Opacifiers
- Therapeutic agents – Fluoride, Triclosan, Arginine/Calcium Carbonate, Potassium Nitrate, Pyrophosphate, Peroxide

Abrasives

- Remove stains and plaque – found in all toothpastes
- Most commonly – Silica
- RDA (radioactive dentine abrasivity) acceptable standard ≤250

SLS

- Most common surfactant used in toothpastes
- Sensitivity to SLS is not widespread – more common in people with xerostomia

Fluoride concentrations

- Stannous fluoride, sodium monofluorophospate and sodium fluoride all have comparable clinical efficacy
- 400-500ppm: low concentration fluoride for children up to 6 years to lower fluorosis risk [2-4]
- 1000-1500ppm: maximum concentration of fluoride found in toothpastes in supermarkets
- 5000ppm: available through pharmacy and dental professionals – for high risk patients

Fluoride Safety

- ARCPOH Guidelines[5] recommendations regarding toothpaste:
  - ≤17months: brushing without toothpaste
  - 18months-5years: twice daily brushing with low fluoride toothpaste (400-500ppm). Use pea-sized amount of toothpaste and brush with adult supervision. Children should spit out, not swallow and not rinse
  - ≥6years: twice daily brushing with 1000 - 1500ppm toothpaste. Toothpaste should be spat out, not swallowed and not rinsed.
  - Children in non-fluoridated areas or those at higher risk of caries – recommendations should be validated based on dental professional advice
  - Teenagers, adults and older adults at higher risk of caries – dental professional advice regarding use of toothpaste containing ≥1000 -1500ppm and up to 5000ppm fluoride.

Triclosan/co-polymer

- Broad spectrium antibacterial – only when combined with co-polymer can offer extended antibacterial action in the mouth

- Extensive clinical research shows proven efficacy:
  - Reduces gingival bleeding and gingival inflammation
  - Assists in the prevention and treatment of gingivitis
  - Assists in the management of periodontitis by slowing its progression
  - Reduces supra-gingival calculus
  - Protects against decay and cavities

- Mode of action:
  - Anti-microbial effect – Triclosan
  - Anti-inflammatory effect – Triclosan
  - Substantivity – PVM/MA copolymer
  - Safety – no evidence of triclosan resistance with long-term use

Arginine/calcium carbonate for caries

- Arginine is a natural amino acid found in saliva
- Compatible with fluoride
- Arginine is used by some plaque bacteria to form ammonia which increases the plaque pH
- Calcium is the first mineral lost from the tooth during acid attack - it helps promote remineralisation
- Pro-Argin™Technology complements fluoride by reducing demineralisation and increasing remineralisation beyond the benefit of fluoride alone
- Clinical studies of toothpaste with Pro-Argin™ and 1450ppm Fluoride show:
  - 20% less new cavities at 2 years[13, 14]
  - Reduced early decay by half [15, 16]
  - 4 times greater remineralisation compared with regular fluoride toothpaste [17]

Arginine/calcium carbonate for Hypersensitivity

- Arginine is a bipolar molecule that interacts with calcium carbonate and promotes the precipitation of calcium and phosphate on the dentine surface forming an acid-resistant layer that blocks open tubules
- Provides immediate relief from dentine sensitivity when directly applied to each sensitive tooth with a fingertip for 1 minute
- Provides long-lasting relief from dentine sensitivity when used twice daily
- Provides superior relief compared to potassium-based toothpastes

Potassium Salts (potassium nitrate and potassium citrate)

- Dentine sensitivity results from exposed dentine surfaces and open dentinal tubules
- Act to desensitise pulp nerve fibres stimulated by fluid movement in open tubules

Pyrophosphates

- Prevent calculus formation by inhibiting crystal growth in plaque

Peroxide (hydrogen peroxide and carbamide peroxide)

- Historically, whitening toothpastes only contained higher levels of abrasives to remove extrinsic stains. More recently peroxide has been added to whiten teeth by breaking down intrinsic stains

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