Caries Management Course
Module: Topical Therapies

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• The author of this video does not endorse the use of any topical agent not approved for use in children.

Caries Management Plan
Data Collection
Risk Assessment
Treatment
Follow-Up

Interview
Clinical Exam
Risk Level
Restorative
Fluoride
Self Management
Diet
Oral Hygiene Prescriptions

Reminders
Recall Appt
Non-Fluoride Therapies

- Topical Calcium and Phosphate
- Antimicrobials
- Anti-Plaque Agents
  - Combining Antimicrobials with Fluoride Therapy

FDA

- There are very strict requirements for labelling anti-caries effects.
  - Fluoride products are grandfathered
- Treating or preventing a disease such as caries is considered a DRUG in most cases.

FDA

- Gingivitis and Anti-Plaque Effect and dentin sensitivity are an unusual exceptions for the FDA. Not diseases.
- This goes through a medical device 510(k) approval process.
- Google “FDA Delmopinol Approval”

FDA

- Other dental products are approved as medical devices 510(k) when used in a surgical procedure.
- Cavity varnishes-1% Chlorhexidine varnish
FDA

• Other products that are being used ‘off-label’ for any dental use or grandfathered compounds that existed before FDA approval process.

• Silver Nitrate or Hypochlorite

FDA

• Most products that are approved are not approved for use for children under 12.

• Most OTC mouthrinses

FDA

• Most companies do not bother themselves to test OTC for children under 12.

• Likely not worth the extra expense to run trials

Why does the FDA matter

• Establishes safety, provides guidance on potential interactions, and ultimately protects individuals.

• Especially important in repeated use

• The FDA process for drugs is too expensive for dental products.
Why Take the Risk?

- Why would you use a topical agent that has no safety profile in children?
- The overuse of fluoride may be one reason.
- But you have nutritional and oral hygiene interventions.

Antimicrobials

- I am going to skip over a lot of mechanism of actions on bacteria and pharmacology.

Topical Therapies

- There is weak or no evidence to suggest that any topical therapy has a caries-preventive effect.
- 2011 ADA recommendations on non-fluoride topical therapies.

Topical Agents

- Antimicrobials/Anti-Plaque Agents
- Ca/Phosphate/Fluorides
- Dental Plaque Biofilm
- Enamel
Topical Therapies

• No single antimicrobial intervention is likely to ever have a caries-preventive effect.
• Mouthrinse versus Diet. Diet will likely influence the biofilm considerably more.
• Understanding CAMBRA Treatment Effects (abstract and Discussion Section First)

Antimicrobials

• 0.12% Chlorhexidine
  – Good substantivity
  – Reduces \textit{S. mutans} by a factor of 10
  – \(10^3 \rightarrow 10^4\) CFU/ml of saliva
  – Does not affect other bacteria tested \textit{Lactobacillus}
  – Taste issues and staining

Antimicrobials

• 0.12%-1% Chlorhexidine
  – Antimicrobial effects
  – hydrophilic and hydrophobic
  – Does not remove biofilm/plaque
  – Reduces plaque build-up BUT.......
  – \textbf{No} coronal caries preventive effect shown

Antimicrobials

• 0.12%-1% Chlorhexidine
  1. Does not remove biofilm/plaque
  2. Reduces plaque build-up

Maybe used as an adjunct
Within an overall caries management plan.

Patient with overall good oral hygiene but has high/fast build-up of plaque
Antimicrobials

- Chlorhexidine Varnishes or Gels
  - No coronal caries preventive effect shown
  - Root caries may be improved (may be related to the anti-collagenase activity)

Antimicrobials

- Cetylpyridinium Chloride (CPC)
  - Antimicrobial effects
    - Quaternary ammonium
    - Hydrophilic and hydrophobic
    - Low substantivity
    - Not very effective against plaque
  - No coronal caries preventive effect shown

Antimicrobials

- Delmopinol
  - Antimicrobial effects
    - Limited
    - Surfactant Properties
    - Not very effective against plaque
    - Worse taste ever!!!!!!!!!!!!!!!!!!!
  - No coronal caries preventive effect shown

Antimicrobials

- Triclosan
  - Antimicrobial effects
    - Limited
    - Affects cell membrane synthesis
    - Biofilm may increase with low levels
    - Environmental concerns-ubiquitous use
  - No coronal caries preventive effect shown
Antimicrobials

- 10% Povidone Iodine
- Applied before fluoride varnish
- Antimicrobial effects
  - Generalized
  - May reduce plaque levels in short term
  - Require multiple professional applications
  - *Shellfish Allergy and Overexposure a concern*
  - *No* coronal caries preventive effect shown

Antimicrobials

- *Silver Nitrate and Silver Diamine Fluoride*
- Agents in Caries Control/Interim Therapeutic Restorations
- SDH is market approved for dentin sensitivity
- Silver ions are antimicrobial
- Limited Data and safety issues

Secondary Prevention for 0-5:
Disrupting Vertical Transmission Infection

Chlorhexidine

- *Not Shown to Have an Effect on Reducing the Vertical Transmission of S. Mutans and S. Sobrinus*
Reduced transmission of *S. mutans* and *S. Sobrinus* - Mother chew 4-7x/day xylitol gum at 3 months postnatal

Long term effects of reduced transmission support how preventing early colonization *S. Mutans and S. Sobrinus* improves oral health

Caries Prevention
Vertical Transmission

PRACTICALITY OF CHEWING GUM SO OFTEN!!!!!

Infant Wipes with Xylitol
No better than the control wipe
No coronal caries preventive effect shown

Xylitol is toxic to Dogs
In humans, xylitol dose not cause a release of insulin from the pancreas.
But in non-primates, it does.
Severe Hypoglycemia

*In Minnesota, an average of nearly 25 calls/month to animal poison control are related to xylitol poisoning!*
CPP-ACP

Casein phosphopeptide – amorphous calcium phosphate, or CPP-ACP, is a milk-derived peptide that improves the bioavailability of Calcium and Phosphate

**MI Paste shows promise**
But works better with fluoride
MI Paste with Fluoride

Remineralization Products

![Chemical Structures]

**C**al**P**hos**S**ilic**A**te
**Cl**inpro 5000™ with 5000 ppm F
Vanish varnish

**CPP-ACP**
Milk-derived protein peptide that "holds" bioavailable Ca and P

**Recaldent™**
MI Paste
MI Paste Plus (900 ppm F)

Conclusion

1. Topical Agents can be considered as an adjunct to an overall caries management plan.
2. May provide plaque reduction or additional sources of Ca and Phosphate
3. No single agent provides a proven caries prevention effect.

Conclusion

Topical Fluorides continue to provide the greatest anti-caries benefit of available therapeutics.