Two Decades of Tooth Whitening
What Has Changed?

Course Description:
The demand for esthetic dentistry has increased in recent years. Whitening products have evolved to meet the needs of today’s dental patients. This course will outline the evolution of these products using current scientific literature and evidenced-based strategies. To provide clinicians practical guidelines, different types of products and materials will be reviewed to aid the dental professional in choosing the most appropriate product and technique. By comparing tooth whitening advancements that have taken place over the last two decades, clinicians can help their patients achieve the best clinical results.

Lecture Objectives:
Upon completion of the course, participants will be able to:

- Implement ADPIE in relationship to tooth whitening
- Describe the mechanism of action of tooth whitening
- Review different types of discolorations
- Discuss potential side effects and precautions with tooth whitening
- Discuss treatment options for tooth sensitivity due to tooth whitening
- Discuss alternative uses for whitening products

1. Definitions

- **Bleaching**: involves free radicals and the breakdown of pigment, which occurs in the tooth bleaching procedures
- **Whitening**: refers to the use of abrasive agents contained in a dentifrice to remove extrinsic stains
- **Niteguard Vital Bleaching (NGVB)**: the use of a custom tray that allows for administration and containment of tooth bleaching material such as Carbamide peroxide or hydrogen peroxide
- **Extrinsic**: occur on the external surface of the tooth and may be removed by procedures of toothbrushing, scaling, and/or polishing
- **Intrinsic**: occur within the tooth substance and cannot be removed by techniques of scaling and polishing
- **Oxidation**: chemical process utilizing peroxide, as the oxidizing agent penetrates the porosities in the rod-like crystal structure of enamel and breaks down stain deposits in the dentin

2. History

- Barbers were the first to actually whiten teeth
  - Red/White barber pole
  - Barbers doubled as surgeons
    - Filed down teeth with metal file
    - Applied highly corrosive nitric acid
- 2000 BC - 2000 BC Egyptians pumice & vinegar
  - Ancient Romans used urine and goat milk
  - Utilized well into 18th century
- 18th Century - First esthetic dentistry Dr. Truman
  - 1854 used chlorinated lime and chlorine gas
- Today
• Carbamide Peroxide
• Hydrogen Peroxide
• Laser
• Enhancement of appearance
  ▪ Considered more attractive
  ▪ Look younger
  ▪ Portrays GOOD health
• Medical/Dental history for whitening
• Communication
  ▪ Identify underlying problems causing discoloration
    ▪ May prevent color change
  ▪ Precipitate need for additional treatment
  ▪ Color appearance may worsen if source of problem isn't resolved
• Administration
• Delivery
• Implementation and monitoring

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3. Research

• ADA Recommendations
  ▪ Always consult with dentist
  ▪ Complete evaluation of oral environment
  ▪ Dentist and patient collaborate on treatment
  ▪ Whitening and restorative treatment combination

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4. Mechanism of Action

• Concentration of active ingredient-% of active ingredient
• Exposure time-minutes to hours
• Formulation-Hydrogen Peroxide vs Carbamide Peroxide
• Oxidation
• Whitening factors
  ▪ Free radicals attack large color molecules
  ▪ Carbamide Peroxide => H₂O₂ & urea
  ▪ Hydrogen Peroxide => H₂O & O
5. Diagnosis and Assessment

- ADPIE
- Patient needs to know limitations and results of whitening vs. other esthetic treatment
  - Amalgam restorations
  - Defects in gingival architecture
  - Effects of fluorosis
  - Esthetic restorations
  - Facial imperfection
  - Gummy smile
  - Misaligned teeth
  - Root surface
  - Tetracycline stain
  - Translucent teeth
  - Tobacco stain
  - White spots

6. Planning and Preparation

- Use only as directed
- Don’t overload tray
- Fully seat tray
- Store properly
- Contact office

7. Products and Modes of Delivery

- Professional application
  - Take home
    - Carbamide Peroxide solutions 10%, 15%, 20%
    - Hydrogen Peroxide solutions 24%, 36%, 40%
  - In-office
    - Power whitening
    - Laser
- Non-professional application
  - Mall kiosks, spas, cruise ships
  - Supreme Court ruling 2015
- Pens, mouth rinses, toothpastes, strips, pens
  - Light activation
    - Acidic agents cause demineralization
    - Controversial/varied outcomes
    - Different thickness of enamel
    - Saliva - buffers, remineralization and re-hydrates
    - Several mechanisms
    - Streaking or blotching
    - Tooth dehydration
    - Transient

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8. Maintenance and Sensitivity

- Mechanism of sensitivity
- Enamel & dentin permeable to hydrogen peroxide
  - Causes reversible pulpitis
- Hypertonic nature of gel may activate hydrodynamic mechanism
- Mechanical pressure from tray
- Onset of sensitivity
- Occurs within first 2 weeks
- Dependent upon
  - Concentration of whitening agent
  - Frequency of application
  - Inherent patient sensitivity
- Preventive strategies
  - Brush with 5% Potassium Nitrate desensitizing paste 2 weeks prior
  - Wear empty tray for 1-2 nights
  - Wear tray with Potassium Nitrate 1-2 nights before whitening
  - Continue brushing with Potassium Nitrate
    - 30 mins. prior to tray insertion
    - 30 mins. after whitening
- Therapeutic strategies
  - Passive
    - Decrease concentration of whitening agent
    - Reduce wear time or frequency of application
    - Temporarily interrupt treatment
  - Active
    - Continual brushing with desensitizing paste
    - Wear tray with desensitizing paste 10-30 mins.
- Wear tray with desensitizing paste overnight 1-2 nights
- Professional strength fluoride products
  - Ocludes tubules-forms calcium fluoride precipitate
    - 5000 ppm (1.1%) NaF
    - 5% NaF varnish
    - 0.4% Stannous fluoride
- Calcium phosphate technologies
  - Ocludes tubules-forms calcium phosphate precipitate or HCA-like layer
    - ACP
    - ACP-CPP-Recaldent®
      - MI Paste™ & MI Paste Plus ™ products
      - Not a cleansing paste
      - Requires multiple applications/day
      - Releases ACP during acid challenge
- Calcium sodium phosphosilicate-NovaMin®
  - NUPRO® extra care prophy paste
  - Releases calcium & phosphate forming an enamel-like mineral layer
- Arginine bicarbonate & calcium carbonate PRO-ARGIN™ Technology
  - Colgate® Sensitive Pre-Procedural Desensitizing Paste with Pro-Argin ™ Technology
  - In-office application only
  - No phosphate
  - Occludes tubules via calcium deposits
  - Not a polishing paste

9. Influencing Factors on Treatment
- Speed of color change can only be pushed so far
- Teeth do not whiten at the same rate
- Some will whiten faster
  - Some tooth color change noticeable within days
  - Others may take extended period of time (2-6 weeks)
  - Increasing length of treatment or percentage of solution may not impact rate
- Reversal post treatment occurs and stain reappears
  - Hydrogen Peroxide changes color of stain doesn’t remove stain molecules
  - Time that elapses post treatment varies
- Etching caused by acidic formulations result in whiter appearance
  - Tooth rehydrates and remineralizes, whiter effect disappears
10. What’s On The Horizon

- Research today is looking beyond the cosmetic outcomes of whitening
  - Benefit of tray whitening to prevent caries in elderly
  - Prevention of white-spot lesions in orthodontic population
- Additional studies/benefits
  - Improvement in soft tissue health and elimination of oral malodor
  - 10% Carbamide Peroxide kills one of two bacteria causing caries (lactobacillus)

11. Summary

- Tooth whitening is safe and effective
- Vital to perform a pre-whitening examination & diagnosis
- Common problems associated with whitening
  - Resolved when clinicians are aware
- Tooth whitening is in high demand by patients
  - Can be successfully implemented in dental practices today
REFERENCES


34) http://www.drbicuspid.com/index.aspx?sec=sup&sub=cos&pаг=dis&ItemID=313229
