“AIR POLISHERS: MORE THAN A STAIN REMOVAL DEVICE”

Cynthia Fong, RDH, MS

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12:30 pm – 3:30 pm
“Air Polishers: More Than a Stain Removal Device”
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COURSE DESCRIPTION:
Air polishers and their expanded applications have not been embraced by the majority of clinicians today. Topics to be discussed include: information on the safety and efficacy of air polishers; indications for use including enhanced applications such as subgingival air polishing, tooth preparation prior to bonding and sealants, use on cosmetic restorations and orthodontic patients; instruction on clinical instrumentation; patient medical indications and equipment maintenance.

COURSE NOTES
1. Definitions

Polishing:
- to achieve a smooth, mirror like enamel or material surface that reflects light and is characterized as having a high luster
- accomplished with a fine grit abrasive agent so that the surface scratches are smaller than the wavelength of visible light (\(< 0.5\mu m\))
- may also include cleansing

Coronal polishing: a procedure designed to make the tooth free of plaque and extrinsic stain

Therapeutic polishing: polishing of the root surfaces that are exposed during surgery to reduce endotoxin and microflora on the cementum

Cleansing:
- to remove plaque biofilm and extrinsic stain from tooth surfaces after scaling
- accomplished by using a cup/bristle brush on a prophylaxis angle attached to a low speed handpiece or an air powder system
- cleansing can also be accomplished by the patient with a toothbrush, dentifrice and interdental cleaning devices

Selective Polishing:
- optional and site specific
- cleansing and polishing procedures are only provided when justified by tooth surfaces that have visible stains after scaling and oral debridement is complete
- newly erupted teeth, crowns, and composite restorations are usually avoided to prevent damage to restored and natural teeth
- stain removal is essentially done for aesthetic and not for health-based reasons

2. Common Dental Stains

| Type: | ______________________________ |
| Causes: | ______________________________ |
| Removal: | ______________________________ |

| Type: | ______________________________ |
| Causes: | ______________________________ |
| Removal: | ______________________________ |

| Type: | ______________________________ |
| Causes: | ______________________________ |
| Removal: | ______________________________ |

3. Traditional Polishing
   Factors that contribute to abrasion
   a. ______________________________
   b. ______________________________
   c. ______________________________
   d. ______________________________


4. Mohs Scale of Mineral Hardness
   Characterizes the scratch resistance of various minerals through the ability of a harder material to scratch a softer material.

5. Principles of Removing Extrinsic Stain
   - speed
   - pressure
   - abrasive agent
     - particle shape
     - type

6. Devices for Extrinsic Stain Removal
   - manual toothbrushes
   - power toothbrushes
   - dentifrices
   - rubber cup
     - polishing paste
     - alternative agents
   - air polishing
Selective Extrinsic Stain Removal (SESR)

**Purpose:** To remove extrinsic stains after professional scaling, using a rubber cup, bristle brush, disks, points and/or an air-powder polishing system dependent on the assessed needs of the patient.

8. **Air Polishing (AP)**
   A system that uses a combination of compressed air, water and a specially processed sodium bicarbonate to remove extrinsic stain. The system is used as an alternative to traditional polishing.

9. **AP - Advantages**
   Air polishers have been proven to remove extrinsic stain more rapidly and thoroughly than scalers, abrasives in rubber cups, strips, etc., without significant changes in surface appearance of enamel or dentin. In comparison to traditional polishing methods, air polishing is:
   - more efficient
   - less abrasive
   - more cost effective
   - more versatile
   - environmentally friendly

10. **AP - Expanded Clinical Applications**

11. **AP – Agents**
   - Sodium Bicarbonate
   - Aluminum Trihydroxide
   - Calcium sodium phosphosilicate
   - Calcium Carbonate
   - Glycine

12. **AP – Medical Considerations**
   - Systemic steroid therapy
   - Patients taking diuretics
   - Compromised respiratory conditions
   - Communicable diseases
   - Sodium restricted diets
   - Hypertensive patients
   - Chronic end-stage kidney disease

13. **AP – Dental Considerations**
   - Amalgam
   - Gold
   - Composite resins
   - Exposed root surfaces
   - Implants
14. **Air Polishing – Preparation**
   - **Unit**
     - Adjust power indicator
     - Adjust water/powder ration
     - Foot control
     - Air nozzle
   - **Patient**
     - Patient positioned at a 45 degree angle
     - Head turned toward operator
     - Direct vision and external fulcrums
     - Position high volume evacuator and/or saliva ejector
     - Place mouthwash-soaked 2 x 2 gauze square/cotton roll on the floor of the mouth

14. **Air Polishing – Clinical Technique for Extrinsic Stain Removal**
   - Use thumb and forefinger to grasp the patient’s lip and/or cheek to form a cup
   - Use hand to contain aerosols
   - Nozzle tip 3 to 4 mm from the tooth
   - Directed at the middle to incisal third of the tooth
   - Constant circular motion
   - Polish 1 to 2 teeth for 1 to 2 seconds
   - Rinse excess slurry often

15. **Air Polishing – Instrumentation for Extrinsic Stain Removal**
   - Anterior: ________ degree angulation
   - Posterior: ________ degree angulation
   - Occlusal: ________ degree angulation

16. **Subgingival Air Polishing**
   - **Purpose:** to remove subgingival biofilm and clean root surfaces
   - **Agents:** Glycine powder air polishing (GPAP)
   - Erythritol
   - **Clinical Technique:**
     - Use specially designed nozzle that possesses multiple openings; are thin and tapered
     - Properly position high volume evacuation
     - Gently insert nozzle subgingivally until resistance if felt; slightly withdraw the nozzle to allow for at least a 3mm distance from the base of the pocket to the tip of the nozzle
     - Activate the air polisher and instrument the entire subgingival root surface using a circular motion for 5 seconds per surface.

17. **Air Polishing – Equipment Maintenance**
   - **End of Day**
     - Empty powder chamber at the end of the day
     - Store powder in a cup that has a tightly secured cap
     - Flush system and use high volume evacuator to remove any residual powder
     - Secure powder chamber cap on the unit
   - **Start of Day**
     - Fluff powder before re-filling powder chamber
     - Ensure that excessive powder does not fill the air flow tube
18. Alternative Strategies for Extrinsic Stain Removal
   • Rubber Cup and Prophylaxis Paste Technique
     - Select appropriate grit paste based on oral assessment
     - Change cups or brushes in between use
     - Use in progression
       > Coarse – Medium - Fine
     - Rinse area thoroughly before applying the next agent
   • Substitute Agents

<table>
<thead>
<tr>
<th>Restoration</th>
<th>Abrasive Agent</th>
<th>Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite Resins</td>
<td>Aluminum Oxide</td>
<td>Paste, Rubberized Polishers</td>
</tr>
<tr>
<td>Diamond Abrasives</td>
<td>Paste, Rubberized Polishers</td>
<td></td>
</tr>
<tr>
<td>Silicon Dioxide</td>
<td>Rubberized Polishers</td>
<td></td>
</tr>
<tr>
<td>Zirconium Oxide</td>
<td>Rubberized Polishers</td>
<td></td>
</tr>
<tr>
<td>Zirconium Silicate</td>
<td>Paste, Disks, Strips</td>
<td></td>
</tr>
<tr>
<td>Porcelain</td>
<td>Aluminum Oxide</td>
<td>Paste, Rubberized Polishers</td>
</tr>
<tr>
<td>Ceramics</td>
<td>Aluminum Oxide</td>
<td>Paste, Rubberized Polishers</td>
</tr>
<tr>
<td>Carbide Compounds</td>
<td>Multifluted Finishing Polishers</td>
<td></td>
</tr>
<tr>
<td>Diamond Paste</td>
<td>Paste</td>
<td></td>
</tr>
<tr>
<td>Microfilled Composite</td>
<td>Carbide Compounds</td>
<td>Multifluted Finishing Polishers</td>
</tr>
<tr>
<td>Glass Ionomer Composite</td>
<td>Glass Ionomer products</td>
<td>Paste</td>
</tr>
<tr>
<td>Gold</td>
<td>Brown, Green</td>
<td>Cups and Points</td>
</tr>
<tr>
<td></td>
<td>Silex, Tin Oxide, Submicron aluminum oxide</td>
<td>Rubber cup</td>
</tr>
</tbody>
</table>

• Cleaning Agents
  - Flat, round particles that produces a high luster
  - Active ingredient: feldspar (alkali: sodium, potassium and calcium aluminosilicates)
  - Formulated into a powder
  - Mix with sodium fluoride or water; apply as a paste
  - Examples:
    > ProCare® Prophylaxis Paste Mix
    > Polishing Paste (Shimmer™)
    > CPR™ Cosmetic Polishing Restorative Sapphire Paste (Premier)
    > Diamond Micro-polisher Disc (PoGo™)

19. Pastes: Therapeutic Additives
   • Remineralization
     - Fluoride
   • Hypersensitivity
   • Cariostatic

20. Patient Self Care
   • Use the least abrasive toothpaste
     - May be equal to prophylaxis paste
   • Hardness of esthetic restorative materials rivals the hardness of cementum and dentin, not enamel
• Hardness of abrasive agents used in toothpastes are hundreds of times harder than natural tooth structures and even more so than esthetic restorative materials.
• Use a soft bristle toothbrush
• Focus on pressure applied during tooth brushing

21. Selective Extrinsic Stain Removal - Review
• Assess the needs/wants of the patient
• Assess the oral conditions
• Select the appropriate treatment
• Characteristics of the abrasive agent
  - Abrasivity of agent is too low, stain will remain
  - Abrasivity of agent is too high, damage will result
• Clinical technique
• Evidence based treatment decisions
APPENDIX 1: TYPES AND USES OF ABRASIVES

<table>
<thead>
<tr>
<th>TYPE OF ABRASIVE</th>
<th>EXAMPLE OF DEVICE</th>
<th>TYPE OF RESTORATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Oxide</td>
<td>Paste, polymer discs, strips, rubber wheels and points, white stone</td>
<td>Porcelain, ceramics, composite resins</td>
</tr>
<tr>
<td>Carbide Compounds</td>
<td>Multifluted finishing burs, discs, cups, points or wheels (slow speed handpiece)</td>
<td>Microfilled composites, ceramics</td>
</tr>
<tr>
<td>Diamond Abrasives</td>
<td>Diamond finishing burs, rubberized polishers, discs, brushes, paste</td>
<td>Composite resins</td>
</tr>
<tr>
<td>Silicon Dioxide</td>
<td>Rubberized cups or points, finishing and polishing</td>
<td>Composite resins</td>
</tr>
<tr>
<td>Zirconium Oxide</td>
<td>Rubberized finishing and polishing rotary shapes</td>
<td>Composite resins</td>
</tr>
<tr>
<td>Zirconium Silicate</td>
<td>Strips, disks and prophylactic paste</td>
<td>Composite resins</td>
</tr>
</tbody>
</table>

APPENDIX 2: EXAMPLES OF POLISHING PASTES
(Adapted from Jones T. Polishing techniques for beauty and longevity. Dentistry Today 2009)

<table>
<thead>
<tr>
<th>POLISHING AGENT</th>
<th>PRODUCT EXAMPLE</th>
<th>RATIONALE FOR USE</th>
<th>MANUFACTURER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon dioxide</td>
<td>Proxyt Coarse</td>
<td>Removal of stains on porcelain and composite materials</td>
<td>Ivoclar Vivadent</td>
</tr>
<tr>
<td>Silicon dioxide</td>
<td>Proxyt Medium</td>
<td>Plaque removal, polishing on porcelain and composite materials</td>
<td>Ivoclar Vivadent</td>
</tr>
<tr>
<td>Perlite</td>
<td>Clinpro</td>
<td>Removal of stain, plaque removal on porcelain and composite, starts coarse and breaks down to fine</td>
<td>3M ESPE</td>
</tr>
<tr>
<td>Aluminum oxide</td>
<td>Nupro Shimmer Enamelizer</td>
<td>Improve luster, shine, polish on composites</td>
<td>DENTSPLY COSMEDENT</td>
</tr>
<tr>
<td>White sapphire</td>
<td>CRP</td>
<td>Gentle stain removal and restoration of luster on porcelain and composite materials, Gentle stain removal without pumice, reduces sensitivity, safe for porcelain and composite materials. Porumice free.</td>
<td>ICCare Waterpik Sunstar Butler</td>
</tr>
<tr>
<td>Novamin</td>
<td>Softshine NuCare</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diamond paste</td>
<td>Diamond Polish</td>
<td>Improves shine, luster, high gloss on porcelain</td>
<td>Ultradent Premier Dental</td>
</tr>
<tr>
<td></td>
<td>Luminescence Plus</td>
<td></td>
<td>Sultan Dental Products</td>
</tr>
<tr>
<td></td>
<td>Topex Brilliance</td>
<td></td>
<td>Shofu Dental</td>
</tr>
<tr>
<td></td>
<td>Micrograin Paste</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DirectDia Paste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recaldent (CPP-ACP)</td>
<td>MI Paste</td>
<td>Final/Post polishing to decrease sensitivity</td>
<td>GC America</td>
</tr>
<tr>
<td>(No abrasive present)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>