The New Spin on Polishing: A look at the Science, the Surface and Product Selection

Course Description:

Coronal polishing is a topic of much debate. New, updated research allows us to reconsider our position on polishing. This program will provide current evidence based information on different aspects of the polishing procedure including the science behind equipment and technique choices, selection of polishing agents and products, and the impact of these choices on the various surfaces and esthetic materials that make up the 21st century dentition.

Course Objectives:

1. Review current trends in coronal polishing.
2. Discuss the types of polishing methods.
3. List current types of polishing materials which include those providing therapeutic benefit.
4. Describe polishing techniques which include types of abrasives, Moh's hardness, armamentarium and their effect on esthetic materials.
5. Evaluate ergonomic attributes of different polishing techniques.
6. Review the CDC Guidelines for handpiece sterilization.

Concept of Selective Polishing

1. Purpose of polishing is stain removal
2. Limits polishing to coronal areas
3. Stain that cannot be removed by other methods
4. Based on research demonstrating:
   a. Loss of tooth structure from polishing procedure
   b. Loss of fluoride-rich surface enamel from polishing procedures
   c. Thorough brushing and flossing at home can remove dental plaque/biofilm as effectively as polishing
   d. No additional benefit to patient

Concept of Essential Selective Polishing

1. What surface since polishing can be more abrasive to:
   a. Exposed root surfaces
   b. Restorations are often in the path of the polishing device
   c. Cementum
   d. Dentin
   e. Certain restorative materials
2. Criteria for Polishing
   a. Presence of stain on teeth or esthetic material
   b. Individual to patient
   c. Technique
      i. rubber cup - abrasion
      ii. air polishing - erosion
Mechanism of Polishing – Handpiece and Rubber Cup

1. Use abrasive particle to produce wear
2. Rate is determined by:
   a. Speed
   b. Pressure
   c. Quantity of paste
   d. Shape of abrasive particle
   e. Size of abrasive particle
   f. Hardness of abrasive particle
3. Average effective polishing parameters utilized in practice:
   a. 2500 rpm
   b. 150g pressure
   c. 5 seconds
4. Operating PSI of air driven handpieces
   a. Positive correlation between PSI and speed of rubber cup
   b. Increased speed = increase abrasion and sensitivity
   c. Handpieces range from 36 to 47 PSI
   d. DPS’s range from 16.8 to 28.8

Handpiece and single use device sterilization – 2003 CDC Guidelines
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5217a1.htm

1. “…dental handpieces are considered a semicritical item, they should always be heat sterilized between uses and not high level disinfected.”
2. “Studies using laboratory models also indicate the possibility for retained DNA and viable virus inside both high-speed handpieces and prophylaxis angles.”
3. “Single use disposable device is designed to be used on one patient and then discarded, not reprocessed for use on another patient”

Common Polishing Abrasives

<table>
<thead>
<tr>
<th></th>
<th>Size of Abrasive - Grit</th>
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<tbody>
<tr>
<td>Silex (Silicon Dioxide)</td>
<td>Fine 0 to 10 µm</td>
</tr>
<tr>
<td>Rouge (Jeweler’s Rouge)</td>
<td>Medium 10 to 100 µm</td>
</tr>
<tr>
<td>Pumice</td>
<td>Course 100 to 500 µm</td>
</tr>
<tr>
<td>Calcium Carbonate</td>
<td></td>
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<tr>
<td>Garnet</td>
<td></td>
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<tr>
<td>Tin Oxide</td>
<td></td>
</tr>
<tr>
<td>Emery (Corundum)</td>
<td></td>
</tr>
<tr>
<td>Sand</td>
<td></td>
</tr>
<tr>
<td>Aluminum Oxide (Alumina)</td>
<td></td>
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<tr>
<td>Levigated Alumina</td>
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Calcium Phosphate Technologies - occlude tubules by forming a calcium phosphate precipitate or HCA layer
1. ACP
   a. Highly Soluble/low substantivity
   b. Not bioavailable after product is rinsed
2. ACP-CPP (Recaldent™)
   a. Releases ACP during acid challenge
   b. Not a cleansing paste; requires multiple applications/day
   c. Commercially available in MI Paste products
3. Calcium sodium phosphosilicate (NovaMin®)
   a. Releases calcium & phosphate at neutral pH, directly forming HCA layer
   b. Commercially available products-NUPRO extra care prophy paste powered by NovaMin®

Mechanism of Polishing – Air Polishing

1. Generate a slurry of pressurized air, powder, and water to remove stain and biofilm
2. Two concentric tubes
3. Types of systems
   a. Self- contained
   b. Attach to handpiece cable

<table>
<thead>
<tr>
<th>Air Polishing Abrasives</th>
<th>Mohs Hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Bicarbonate</td>
<td>2.5</td>
</tr>
<tr>
<td>Aluminum Oxide</td>
<td>2.2 to 2.5</td>
</tr>
<tr>
<td>Calcium Carbonate</td>
<td>3</td>
</tr>
<tr>
<td>Glycine</td>
<td>2</td>
</tr>
<tr>
<td>Erythritol</td>
<td></td>
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Considerations

1. Medical
   a. Sodium restricted diet
   b. High blood pressure
   c. Renal disease or diuretic therapy
   d. Respiratory disease
   e. Infectious disease
2. Dental
   a. Exposed root surfaces
   b. Severely inflamed gingiva
   c. Restorative material
      i. Composites
      ii. Glass ionomers

Technique
1. Universal precautions and standard PPE are required
2. Adjust backrest
3. Position patient chin-up or chin down
4. Adjust powder flow
5. Evacuate with HVE
6. Rinse tongue frequently
7. Proper angulation

<table>
<thead>
<tr>
<th>Anterior</th>
<th>60°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior</td>
<td>80°</td>
</tr>
<tr>
<td>Occlusal</td>
<td>90°</td>
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</tbody>
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**Expanded use of Air Polishing**

1. Orthodontics
   a. Surface preparation
   b. Maintenance – select power that’s safe on brackets and bonding material
2. Dental sealants
   a. Surface proportion
   b. Generally not recommended for use on sealed surface
3. Periodontal Therapy
   a. Requires different equipment and power for subgingival air polishing compared to supragingival air polishing
   b. Adjust technique to reduce tissue injury
4. Implant Maintenance

**Criteria for Maintaining the 21st Century Smile**

1. Be familiar with types of restorative materials
   a. Composite restorations
   b. Glass ionomers
   c. Compomers
   d. Dental Ceramics
      i. Ceramcometal restoration
      ii. Porcelain veneer
      iii. All-ceramic restoration
   e. Dental implant / titanium
2. Clinically distinguish between hard tooth surfaces and esthetic restorations
3. Modify procedures to maintain integrity of esthetic restoration
   a. Rubber cup polishing
      i. Non-abrasive paste
1. Fine prophy paste
2. Tin oxide
3. Aluminum oxide
4. Diamond paste
5. Diamond micro-polisher

b. Air Polishing
   i. Determined by area to be polished – supra vs. sub
   ii. Select appropriate air polishing powder

4. Avoid the “all tooth surfaces are maintained equally” approach

References
Kargas et al. (2014). Pilot study on the clinical and microbiological effect of subgingival glycine power air


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