Characteristics of Enamel Lesion Restorations Placed by National Dental PBRN Dentists

1st Annual Western Region Meeting of the National Dental Practice-Based Research Network
October 20, 2012, Portland, OR

Support: NIDCR U01-DE-16746, U01-DE-16747, U19-DE-22516
Authors

- J.L. FELLOWS - Kaiser Permanente Center for Health Research, Portland, OR,
- V.V. GORDAN - College of Dentistry, University of Florida, Newberry, FL,
- G.H. GILBERT - Dept. of General Dental Sciences, University of Alabama at Birmingham, Birmingham, AL
- D.B. RINDAL - Research Foundation, HealthPartners, Minneapolis, MN
- V. QVIST - Dept. of Cariology & Endodontics, University of Copenhagen, Copenhagen N, Denmark
- M.S. LITAKER - Dept. of General Dental Sciences, University of Alabama at Birmingham, Birmingham, AL
- P.L. BENJAMIN - Private Practice, Miami, FL
- H. FLINK - Centre for Clinical Research, Uppsala University, Västerås, Sweden
- A. FALCK - Private Practice, Lysekil, Sweden
- D. PIHLSTROM - Permanente Dental Associates, Portland, OR
- N. JOHNSON - Research Foundation, HealthPartners, Minneapolis, MN
- NATIONAL DENTAL PBRN COLLABORATIVE GROUP - University of Alabama at Birmingham, Birmingham, AL
Objective

- To determine which patient, dentist and practice characteristics are associated with restorative treatment of carious enamel lesions
Background

• Guidelines suggest remineralize enamel lesions
  – Preserves tooth structure
  – Lesion progression slow: 10-20%
  – Can arrest/remineralize

• Dentists report restoring high% of enamel lesions
  – 40%↑ (to 80s%) for hypothetical patients (film or in vitro exam)
  – high rates for low and high risk patients

• Actual clinical data are sparse
  – French study: restored 12% occl and 2% prox enamel lesions
  – Washington dentists:

• NDPBRN clinical study of restorative treatment
  – Enamel vs. dentin lesions
  – Patient, dentist, practice characteristics
Participating Regions

Regions: 1) Permanente Dental Associates (PDA) = WA, OR; 2) SK= Denmark, Norway, Sweden; 3) MN; 4) AL/MS; and 5) FL/GA
Study Design

• Observational study of 50 restorations per dentist during routine care
  – Patients ages ≥6 years
  – Previously unrestored permanent tooth surfaces
  – ≤4 restorations per patient
  – Target: 10,000 restorations from 200 dentists

• Dentists gather restoration, patient and dentist/practice data
Measures

• Lesion/Restoration data (pre-operative):
  – Tooth # and surfaces
  – reason (primary caries vs. non-carious defect)
  – diagnostic techniques, materials used
  – Posterior/anterior; proximal/occlusal; smooth surface
  – Lesion depth

Reprinted from Espelid et al. with permission
Patient/Dentist Characteristics

• Patient
  – Age, gender, race/ethnicity
  – Insurance coverage
  – Number of enrolled restorations

• Dentist/practice
  – Age, gender, race/ethnicity, yrs since graduation
  – Practice Busyness
  – Assess Caries risk
  – Practice type (public health, large prepaid group, small group/individual)
Measures

- Dentist data:
  - Usual care dx – visual, tactile, radiographic methods
  - Dentists not calibrated
    - Focus on actual procedures in clinical setting
    - Impractical due to large # dentists

Recruitment

• 229 dentists
• 4,397 patients (19 patients/dentist)
• 8,255 restorations (36/dentist; 1.9/pt)
  – 5,532 occlusal vs. 4,166 proximal
    • 1,443 involved occlusal and proximal surfaces
• 5% excluded – non-carious or on smooth surface
Patient/Dentist Characteristics

• Average among regions
  – 31-36 y.o. with 74%-83% over 18 y.o.
  – 0-9% more females depending on region
  – Non-Hispanic(88%-99%), White(75%-97%), with dental insurance(69-93%)
  – # of Restorations:
    • one (62%), two (24%), three or four (14%)

• Average among regions
  – Male (53%-89%)
  – Middle aged (34-45)
  – White (80%-98%)
  – 15-21 years out of dental school
## Regional Practice Variation

<table>
<thead>
<tr>
<th></th>
<th>AL/MS</th>
<th>FL/GA</th>
<th>MN</th>
<th>PDA</th>
<th>SK</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice busyness (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too busy to treat all</td>
<td>10</td>
<td>3</td>
<td>18</td>
<td>9</td>
<td>24</td>
<td>.0078*</td>
</tr>
<tr>
<td>All treated, burdened</td>
<td>18</td>
<td>11</td>
<td>29</td>
<td>16</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>All treated, no burden</td>
<td>53</td>
<td>63</td>
<td>50</td>
<td>66</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Not busy enough</td>
<td>18</td>
<td>23</td>
<td>4</td>
<td>9</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Assess caries risk (%)</td>
<td>76</td>
<td>49</td>
<td>77</td>
<td>86</td>
<td>85</td>
<td>0.0004*</td>
</tr>
<tr>
<td>Practice type (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;.0001***</td>
</tr>
<tr>
<td>Public health</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Large group</td>
<td>0</td>
<td>0</td>
<td>92</td>
<td>100</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Small group &amp; Individual</td>
<td>98</td>
<td>97</td>
<td>8</td>
<td>0</td>
<td>58</td>
<td></td>
</tr>
</tbody>
</table>
Restoration Depth by Practice Type and Region

% surfaces by type

- PRIVATE
- HMO
- PUBLIC

% surfaces by region

- AL/MS
- FL/GA
- MN
- PDA
- SK
Factors associated with restoration for enamel carious lesions

<table>
<thead>
<tr>
<th></th>
<th>Occlusal lesions</th>
<th>Proximal lesions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR  (CI)</td>
<td>P-value</td>
</tr>
<tr>
<td>Male v. female</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-18 yrs v. 18-44 yrs</td>
<td>2.12 (1.63-2.75)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>45-64 yrs v. 18-44 yrs</td>
<td>0.57 (0.40-0.82)</td>
<td>0.0026</td>
</tr>
<tr>
<td>≥65 yrs v. 18-44 yrs</td>
<td>0.42 (0.20-0.87)</td>
<td>0.0191</td>
</tr>
<tr>
<td>Assesses caries risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (w/ form) v. no</td>
<td>0.33 (0.14-0.75)</td>
<td>0.0079</td>
</tr>
<tr>
<td>Yes (no form) v. no</td>
<td>0.50 (0.30-0.84)</td>
<td>0.0091</td>
</tr>
<tr>
<td>Network Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AL/MS v. PDA</td>
<td>6.62 (3.04-14.44)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>FL/GA v. PDA</td>
<td>3.65 (1.54-8.67)</td>
<td>0.0034</td>
</tr>
<tr>
<td>MN v. PDA</td>
<td>3.22 (1.41-7.37)</td>
<td>0.0057</td>
</tr>
<tr>
<td>SK v. PDA</td>
<td>0.57 (0.17-1.96)</td>
<td>0.3757</td>
</tr>
</tbody>
</table>

OR= adjusted odds ratios; CI= confidence intervals
Factors associated with restoration for enamel carious lesions

<table>
<thead>
<tr>
<th></th>
<th>Occlusal lesions</th>
<th></th>
<th>Proximal lesions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR (CI)</td>
<td>P-value</td>
<td>OR (CI)</td>
<td>P-value</td>
</tr>
<tr>
<td>Male v. female</td>
<td>NA</td>
<td>NA</td>
<td>0.71 (0.54-0.93)</td>
<td>0.0127</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-18 yrs v. 18-44 yrs</td>
<td>2.12 (1.63-2.75)</td>
<td>&lt;0.0001</td>
<td>0.79 (0.51-1.21)</td>
<td>0.2792</td>
</tr>
<tr>
<td>45-64 yrs v. 18-44 yrs</td>
<td>0.57 (0.40-0.82)</td>
<td>0.0026</td>
<td>1.71 (1.19-2.48)</td>
<td>0.0042</td>
</tr>
<tr>
<td>≥65 yrs v. 18-44 yrs</td>
<td>0.42 (0.20-0.87)</td>
<td>0.0191</td>
<td>1.60 (0.84-3.02)</td>
<td>0.1513</td>
</tr>
<tr>
<td>Assesses caries risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (w/ form) v. no</td>
<td>0.33 (0.14-0.75)</td>
<td>0.0079</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Yes (no form) v. no</td>
<td>0.50 (0.30-0.84)</td>
<td>0.0091</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Practice type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private v. HMO</td>
<td>2.28 (1.23-4.25)</td>
<td>0.0092</td>
<td>1.60 (0.84-3.02)</td>
<td>0.1499</td>
</tr>
<tr>
<td>Public v. HMO</td>
<td>0.31 (0.06-1.74)</td>
<td>0.1840</td>
<td>0.15 (0.02-1.10)</td>
<td>0.0621</td>
</tr>
</tbody>
</table>

OR= adjusted odds ratios; CI=confidence intervals
Limitations

- Observational study, not RCT
- Did not include non-restored surfaces
- Dentists’ diagnosis decisions not calibrated
- Highly correlated confounding variables practice region and type
  - AL/MS, FL/GA – small group
  - PDA, MN – large group
  - SK – small group and public health
- Practice region and type are confounding variables
  - Could not separate region and practice type effects
Conclusions

• Enamels caries restorations more common for occlusal (12%) than proximal (6%) lesions

• Factors associated with enamel restorations
  – Region or practice type
  – Patient age
  – Patient gender (proximal lesions only)
  – Caries risk assessment (occlusal only)

• Practice busyness, years since graduation were not related to enamel restorations