Preliminary Findings of Systematic Review of Effectiveness of Sealants in Managing Caries

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Tasks

1. Develop objective, search strategy, and criteria for ordering articles*
2. Run search and establish criteria for first screening of articles*
3. Screen articles and finalize abstraction form and criteria for eligibility into body of evidence*
4. Abstract studies and prepare preliminary report*

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5. Finalize summary of evidence and implications for practice

*Feedback from Expert Work Group

OBJECTIVES AND INCLUSION CRITERIA

Objective

- Examine the effectiveness of dental sealants in managing caries in the pits and fissures of permanent teeth
  - Preventing progression of caries
  - Reducing bacteria levels in lesions

Inclusion criteria

- Cast “wide net”
  - Any sealant material applied over carious lesion in human tooth without prior removal of carious tissue
  - In vivo

SEARCH AND ARTICLE RETRIEVAL

Search Strategy

- MEDLINE, EMBASE, and Cochrane Controlled Trial Register: 1966 to June, 2005
- Key search terms (NIH Caries Consensus Conference):
  - Pit and fissure sealants
  - Dental cements (not including pit and fissure sealants)
  - Dental caries

Search Results

- 4000+ citations screened by 3 reviewers
  - Medline (n = 4350)
  - Embase (n=71)
  - Cochrane (n = 79)

Screening Results

- 311 articles ordered and screened
- 25 qualifying studies were deemed eligible for abstraction

ABSTRACTION AND DESCRIPTION OF STUDIES

Abstraction

- Adopted form used in NIH Caries Consensus Conference
- 25 studies abstracted
  - 2 independent reviewers
  - Consensus reached

Final body of evidence – 22 studies

- Caries progression – 12 studies
- Caries progression and bacteria activity – 3 studies
- Bacteria activity – 7 studies

15 studies examined caries

- Non comparative (n=2)
- Sealant vs. no sealant (n=12)
  - % lesions progressing (n=10)
  - Other outcome (n=2)
- Other comparisons (n=1)

% Carious lesions progressing

- Before after – 4 studies
- **Concurrent controls – 6 studies**

SUMMARIZING EVIDENCE

Assessing quality

- Used USPSTF grading **criteria**
  - **“Good” – meets all criteria**
  - **“Fair” – does not meet all criteria but no fatal flaw that invalidates results**
  - **“Poor” – fatal flaw**

Effect measure - % change in caries progression

$$\frac{\%\ \text{lesions progressing}_{\text{SEALED}}}{\%\ \text{lesions progressing}_{\text{NOT SEALED}}} - 1$$

Data did not support meta-analysis

- Studies conducted analysis at tooth level without adjusting for intra-oral correlation
- Number of subjects not reported
- Studies varied in design
  - Parallel groups - 3
  - Split mouth -1
  - Parallel/split - 2

Summary measure

Median % reduction in caries progression among 6 studies

FINDINGS – 6 STUDIES

Characteristics

Sample size - 1219 teeth

Study	#persons	#teeth	#sites
Florio	31	98	--
Frenken	NR	511	--
Gibson	NR	79	111
Going	NR	67	-
Heller	71	436	--
M-F 1986	14	28	--

Subjects

- Ages ranged from 6 to 19 years
- Background prevention exposure
  - Water fluoridation – Heller
  - Prophylaxis every 3 months – Florio
  - Negative control – Going
  - Not reported – Mertz-Fairhurst, Frenken, Gibson

Baseline caries severity

Author; year; location	Baseline caries
Florio; 2001; Brazil	Non-cavitated
Frenken; 1998; Zimbabwe	Non-cavitated
Gibson; 1980; Canada	Non-cavitated
Heller; 1995; USA	Non-cavitated
Going; 1976; USA	Probably both
Mertz-Fairhurst; 1986; USA	Cavitated

Sealant material

Studies	Material; repaired
Florio	GIC: No
Frenken	GIC; No
Heller	RB3; Yes
Mertz-Fairhurst	RB3; NR
Gibson	RB2; NR
Going	RB1: No

Quality – “Fair”

Study	Quality score
Florio	Fair
Frenken	Fair
Gibson	Fair
Heller	Fair
Going	Fair
Mertz-Fairhurst	Fair

RESULTS – 6 STUDIES

% Caries reduction

Study	Months	No Seal	Seal	% reduction
M-F	11	1.00	0.29	71
Florio	12	0.06	0.00	100
Going	12	0.19	0.07	62
Going	24	0.34	0.24	29
Gibson	30	0.77	0.19	76
Frenken	36	0.31	0.08	73
Heller	60	0.52	0.11	79
Median		**0.34**	**0.11**	**73**

% Reduction in caries progression - sealant material

Material (#observations; #studies)	Median (range)
All (6; 7)	73 (29-100)
All RB (4; 5)	71 (29-79)
RB2 and RB3 (3; 3)	76 (71-79)
GIC (2; 2)	87 (73-100)

% Reduction in caries progression - time

Time (# studies; #observations)	Median (range)
All (6; 7)	73 (29-100)
1 year (3; 3)	71 (62-100)
1 to 2 years (1; 1)	29
2 to 3 years (2; 2)	74 (73-76)
5 years (1; 1)	79

% Reduction in caries progression

No matter how studies were grouped, effect of sealants was strong and consistent

CONCLUSIONS

Limitations

- No studies met current definitions of high quality
- Notable differences in sealant materials, study design and duration, and study methods over time

Main findings

- Sealed lesions consistently had better outcomes than not sealed lesions
- % of sealed carious surfaces progressing was low
- Median reduction = 74% (30%, 100%)
- Evidence for frank, cavitated lesions limited to:
  - Mertz-Fairhurst: 14 persons; 28 teeth

Implications for practice

Findings suggest that sealing non-cavitated lesions results in better outcomes than not sealing.

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