



Dental Practice-Based Research Network
www.DentalPBRN.org

Reasons for placements of restorations on previously un-restored surfaces

Summary of overall results

Table 1: Number and percentage of DPBRN practitioner-investigators and patients participating in this study and number and percentage of restorations placed by dentists from each DPBRN region.

	AL/MS	FL/GA	MN	PDA	SK	Total
Dentists [N (%)]	63 (27.5)	37 (16.2)	31 (13.5)	51 (22.3)	47 (20.5)	229 (100)
Patients [N (%)]	1506 (25.9)	1022 (17.6)	1084 (18.7)	1233 (21.2)	964 (16.6)	5810 (100)
Restorations [N (%)]	2801 (28.3)	1720 (17.4)	1745 (17.6)	2312 (23.4)	1312 (13.3)	9890 (100)

AL/MS: Alabama/Mississippi; FL/GA: Florida/Georgia; MN: HealthPartners and private practitioners in Minnesota; PDA: Permanente Dental Associates and Kaiser Permanente's Center for Health Research; and SK: Denmark, Norway, and Sweden. Percentages are within rows for each variable.

So, these results represent data from 229 DPBRN practitioner-investigators, on 5,810 patients, and on 9,890 restorations.

Results are summarized into these sections:

- 1) A summary of what percent of eligible patients actually participated in the study (page 3)
- 2) A summary of the characteristics of the patients (page 5)
- 3) A summary of results from the remainder of the data collection form (pages 6-13)

Table 2: Percentage of eligible patients and restorations enrolled in the study, based on the Consecutive Patient Log

	AL/MS	FL/GA	MN	PDA	SK	Total
Percentage of eligible patients who enrolled	97%	90%	100%	94%	92%	95%
Percentage of eligible restorations enrolled	95%	87%	100%	96%	79%	93%

Recall that the goal was to enroll all eligible consecutive patients. For the PBRN research context to be judged as successful, we must be able to demonstrate that patients will participate in DPBRN studies. The table above demonstrates that success.

Questions asked regarding the characteristics of the patients who received restorative treatment

1. Patient Gender

- 1 Male
- 2 Female

2. Patient Age in years

3. Patient Race

- 1 White
- 2 Black or African-American
- 3 American Indian or Alaska Native
- 4 Asian
- 5 Native Hawaiian or Other Pacific Islander
- 6 Other (please specify) _____

4. Patient Ethnicity

- 1 Hispanic or Latino
- 2 Not Hispanic or Latino

5. Does the patient have any dental insurance or third party coverage?

- 1 Yes
- 2 No

Table 3: Characteristics of the patients who received restorative treatment by DPBRN region.

Characteristics		AL/MS	FL/GA	MN	PDA	SK	Total
Gender [N (%)]	Male	688 (45.7)	471 (46.0)	441 (41.2)	604 (49.0)	472 (49.0)	2676 (46.0)
	Female	818 (54.3)	551 (54.0)	629 (58.8)	629 (51.0)	492 (51.0)	3119 (54.0)
Age mean in years (SD)		34.1 (18.5)	39.5 (20.2)	34.0 (19.0)	34.7 (16.0)	37.2 (18.3)	35.9 (18.4)
Race [N (%)]	White	1169 (79.0)	873 (88.0)	545 (77.0)	1038 (84.3)	919 (97.6)	4544 (84.8)
	Black ¹	274 (18.5)	102 (10.3)	106 (15.0)	51 (4.1)	2 (0.2)	535 (10.0)
	American Indian ²	23 (1.5)	3 (0.3)	4 (0.6)	7 (0.6)	1 (0.1)	38 (0.7)
	Asian	14 (0.9)	11 (1.1)	45 (6.4)	76 (6.1)	19 (2.0)	165 (3.1)
	Native Hawaiian ³	2 (0.1)	3 (0.3)	0	7 (0.6)	1 (0.1)	13 (0.2)
	Other Race	0	0	8 (1.0)	53 (4.3)	0	61 (1.1)
Ethnicity [N (%)]	Hispanic	23 (1.5)	115 (11.3)	50 (6.6)	79 (6.5)	4 (0.4)	271 (5.0)
	Not Hispanic	1465 (98.5)	903 (88.7)	707 (93.4)	1143 (93.5)	960 (99.6)	5178 (95.0)
Insurance [N (%)]	Yes	1226 (81.7)	677 (66.6)	933 (86.0)	1150 (93.3)	653 (67.9)	4639 (80.0)
	No	274 (18.3)	340 (33.4)	151 (14.0)	83 (6.7)	309 (32.1)	1157 (20.0)

Gender: Most dental studies observe that females are a little more likely to have dental care than males. The current study is consistent with that observation.

Age: S.D.: standard deviation of the mean (average) age.

Recall that there was no specific age requirement in the study – only that the restoration was being done on a permanent tooth. Therefore, the typical lowest age was around 6 years old.

Race: This provides information on the racial background of DPBRN patients who received restorative care – not necessarily the same group that enters the dental care system in general.

Regarding both questions 3 and 4, the selection of DPBRN's five different regions was intentional. One of the reasons for such a diverse array of DPBRN regions was to ensure that we were able to recruit a significant number of racial and ethnic minorities in our studies. Keeping in mind that this study included 5,810 patients, we were indeed successful in recruiting a substantial number of racial and ethnic minority patients.

6. On which tooth and surface(s) did you diagnose primary caries or a non-carious defect?

TOOTH NUMBER

TOOTH SURFACE (MARK ALL THAT APPLY)

- 1 Occlusal
- 2 Mesial
- 3 Distal
- 4 Buccal or Facial
- 5 Lingual or Palatal
- 6 Incisal

Table 4: Type of tooth restored by DPBRN region

Tooth Type	Region %					Overall
	AL/MS	FL/GA	MN	PDA	SK	
Molar	54%	54%	53%	51%	54%	53%
Premolar	23%	25%	25%	28%	28%	26%
Anterior	22%	21%	22%	21%	18%	21%

More than half of the restorations were done on molar teeth. Premolars and anterior teeth each comprised roughly half of the remainder.

Table 5: Tooth surface restored by DPBRN region

Tooth Surface	REGION %					Overall
	AL/MS	FL/GA	MN	PDA	SK	
Occlusal	55%	52%	39%	42%	32%	48%
Mesial	21%	20%	28%	27%	26%	23%
Distal	25%	24%	30%	32%	26%	27%
Buccal/Facial	33%	30%	22%	25%	25%	29%
Lingual/Palatal	21%	16%	12%	15%	8%	17%
Incisal	5%	6%	6%	4%	1%	5%

The percentages in each column add to more than 100% because restorations involved more than one surface.

Almost half of the restorations were done on occlusal surfaces. In the case of AL/MS and FL/GA regions more than half of the restorations were on occlusal surfaces.

7. What is the **main** reason that you placed a restoration in this tooth? (Please mark one response only.)

- 1 Restoration of a non-carious defect (For example: abrasion /abfraction / erosion, fractured tooth, unsightly area)
- 2 Primary caries (The first caries lesion, which is not related to a current restoration, diagnosed on any tooth surface.)

Table 6: main reason for placing a restoration in a tooth by DPBRN region

Main Reason	Region %					Overall
	AL/MS	FL/GA	MN	PDA	SK	
Non-carious defect	14%	22%	8%	12%	23%	15%
Primary caries	86%	78%	92%	88%	77%	85%

The vast majority of the restorations were done due to primary caries.

7a. What technique did you use to diagnose the primary caries lesion? (Please mark all that apply.)

- 1 Clinical assessments including probing
- 2 Radiographs
- 3 Transillumination or optical technique (e.g., Diagnodent®)

Table 7: Technique used to diagnose the primary caries lesion by DPBRN region

Technique(s) Used	Region %					Overall
	AL/MS	FL/GA	MN	PDA	SK	
Clinical assessments	75%	66%	74%	69%	62%	70%
Radiographs	47%	45%	50%	60%	45%	50%
Transillumination-optical	6%	8%	8%	3%	2%	6%

The columns add to more than 100% because more than one choice could be selected.

In all regions, the majority of restorations were diagnosed by clinical assessment followed by radiographs.

7b. How deep did you estimate that the deepest part of the primary caries lesion was *preoperatively*? (Please mark one category only.)

- 1 E1 (Outer ½ of Enamel)
- 2 E2 (Inner ½ of Enamel)
- 3 D1 (Outer ⅓ of Dentin)
- 4 D2 (Middle ⅓ of Dentin)
- 5 D3 (Inner ⅓ of Dentin)
- 6 Uncertain

Table 8: Summary of preoperative assessment of the caries lesion by DPBRN region

Pre-Op Depth	Region %						Overall
	AL/MS	FL/GA	MN	PDA	SK		
E1	7%	3%	1%	1%	1%		3%
E2	18%	13%	6%	7%	2%		10%
D1	44%	51%	58%	61%	49%		52%
D2	22%	26%	27%	23%	36%		25%
D3	9%	5%	8%	7%	12%		8%
Uncertain	1%	1%	0%	1%	0%		1%

Overall, about half of the lesions were judged to be D1 type of lesions followed by D2 type of lesions.

Comparison of response to 7b with ...

7c. How deep did you estimate that the deepest part of the primary caries lesion was **postoperatively**?
(Please mark one category only.)

- 1 E1 (Outer ½ of Enamel)
- 2 E2 (Inner ½ of Enamel)
- 3 D1 (Outer ⅓ of Dentin)
- 4 D2 (Middle ⅓ of Dentin)
- 5 D3 (Inner ⅓ of Dentin)

Table 9: Summary of postoperative assessment of the caries lesion

Pre-Op Depth	Post-Operative Depth					Total
	E1	E2	D1	D2	D3	
E1	53 (43%)	42 (34%)	21 (17%)	6 (5%)	1 (1%)	123 (100%)
E2	2 (1%)	178 (51%)	139 (40%)	22 (6%)	6 (2%)	347 (100%)
D1	7 (1%)	20 (2%)	731 (63%)	356 (31%)	51 (4%)	1165 (100%)
D2	0 (0%)	0 (0%)	29 (6%)	291 (63%)	141 (31%)	461 (100%)
D3	0 (0%)	0 (0%)	1 (1%)	7 (9%)	70 (90%)	78 (100%)
Total [N (%)]	62 (3%)	241 (11%)	932 (42%)	687 (31%)	271 (12%)	2193 (100%)

This table compares the pre-operative assessment of the lesion depth with its post-operative assessment. It does so by looking at the percentage at a given pre-operative depth that was judged to be at a certain depth post-operatively. That is, the cells in a single row add to 100%.

Consistent with the pre-operative estimates, caries lesions that extended to a D1 (42% of total caries lesions) and D2 (31%) final depths were generally the most commonly restored lesions in this study.

In general, pre-operative estimate of caries lesion depth was more concordant with its post-operative depth when the lesion was at an advanced stage.

7d. Why did you restore the non-carious defect?
(Please mark all that apply.)

- 1 Abrasion/abfraction/erosion lesion
- 2 Developmental defect or hypoplasia
- 3 For cosmetic reasons
- 4 To restore an endodontically-treated tooth
- 5 The tooth was fractured
- 6 Other _____

Table 10: Distribution of reasons for restoring non-carious defects by DPBRN region

	AL/MS	FL/GA	MN	PDA	SK	Total
Abrasion/ Abfraction/ Erosion [n (%)]	210 (28.6)	191 (26.0)	27 (3.7)	137 (18.6)	170 (23.1)	735 (43.9)
Developmental defects or Hypoplasia [n (%)]	32 (36.0)	18 (20.2)	3 (3.4)	15 (16.9)	21 (23.6)	89 (5.3)
Cosmetic Reasons [n (%)]	72 (37.7)	77 (40.3)	2 (1.1)	3 (1.6)	37 (19.4)	191 (11.4)
Endodontically-treated teeth [n (%)]	19 (41.3)	4 (8.7)	6 (13.0)	9 (19.6)	8 (17.4)	46 (2.7)
Tooth Fracture [n (%)]	78 (17.8)	85 (19.4)	79 (18.0)	107 (24.4)	90 (20.5)	439 (26.2)
Other [n (%)]	62 (35.2)	57 (32.4)	17 (9.7)	13 (7.4)	27 (15.3)	176 (10.5)
Total [N (%)]	473 (28.2)	432 (25.8)	134 (8.0)	284 (16.9)	353 (21.1)	1676 (100.0)

Abrasion, abfraction, or erosion was the main reason for restoring non-carious defects (44%) followed by tooth fracture (26%)

8. Did you use a base, lining or bonding material?
(Please mark all that apply.)
- 1 None
- 2 Resin-based bonding material
- 3 Glass ionomer, resin-modified glass ionomer
- 4 Calcium hydroxide-based cement or liner
- 5 Varnish (e.g., Copalite)
- 6 Other (specify) _____

Table 11: Use of base, lining or bonding material by DPBRN region.

Material	AL/MS	FL/GA	Region %			Overall
			MN	PDA	SK	
None	28%	20%	44%	30%	8%	27%
Resin-based bonding material	51%	60%	33%	28%	86%	49%
Glass ionomer	11%	10%	10%	10%	8%	10%
Calcium hydroxide-based cement or liner	6%	2%	3%	2%	14%	5%
Varnish	2%	5%	10%	2%	0%	4%
Other	5%	8%	0%	32%	1%	11%

Resin-based bonding material was the main material used prior to restoration placement, which makes sense as the majority of the restorations were done with resin-based composite material (see table 12).

9. What material did you use for this restoration? (Please mark all that apply.)

- 1 Amalgam
- 2 Composite resin, including compomer, directly placed (Brand: _____)
- 3 Indirect composite resin
- 4 Glass ionomer, resin-modified glass ionomer (Brand: _____)
- 5 Ceramic or porcelain
- 6 Cast gold or other base metallic restoration
- 7 Combined metal/ceramic restoration
- 8 Temporary restorative material

Table 12: Dental materials used to restore primary caries by DPBRN region.

DPBRN Regions	Amalgam	RBC	Others	Total
AL/MS [N (%)]	676 (28.3)	1580 (66.2)	130 (5.5)	2386 (100)
FL/GA [N (%)]	289 (21.8)	988 (74.6)	48 (3.6)	1325 (100)
MN [N (%)]	842 (56.3)	532 (35.6)	121 (8.1)	1495 (100)
PDA [N (%)]	1285 (63.2)	681 (33.5)	68 (3.3)	2034 (100)
SK [N (%)]	60 (5.9)	832 (82.0)	123 (12.1)	1015 (100)
Total [N (%)]	3152 (38.0)	4613 (56.0)	490 (6.0)	8255 (100)

Directly placed resin-based composite: RBC; others: indirectly placed resin-based composite, glass ionomer or resin-modified glass ionomer, ceramic or porcelain, cast gold or other metallic-based material, combined metal-ceramic material or a temporary restorative material. Of the 8,351 restorations inserted due to primary caries, a total of 8,255 restorations were recorded with data on the use of dental materials. Percentages are within rows for each DPBRN region.

Overall, resin-based composite was the main restorative material used (56%) followed by amalgam (38%). PDA region used amalgam as the main restorative material whereas in SK amalgam was the least used material.

10. Did you use a rubber dam during the restorative procedure?

- 1 Yes
 2 No

Table 13: Percentage of *dentists* who used a rubber dam on at least one restoration, by DPBRN region.

Used A Rubber Dam	Region %					Overall
	AL/MS	FL/GA	MN	PDA	SK	
Yes	n=63 (25%)	n=37 (32%)	n=31 (19%)	n=51 (88%)	n=47 (13%)	n=229 (37%)

Table 14: Percentage of *restorations* in which a rubber dam was used by DPBRN region.

Used A Rubber Dam	Region %					Overall
	AL/MS	FL/GA	MN	PDA	SK	
Yes	n = 48 (2%)	n = 76 (5%)	n = 59 (4%)	n = 960 (42%)	n = 13 (1%)	n = 1,156 (12%)

In the longevity study, which will follow the results of the current study, we will have an opportunity to link rubber dam usage on these restorations with longevity of the restoration.