



Dental Practice-Based Research Network
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DPBRN 12: Prevalence of Questionable Occlusal Caries Lesions

Results: Overall and by Region

Date prepared: May 18, 2011

Prevalence of the questionable occlusal lesions (QOL) in the study by DPBRN region, from consecutive patient logs.

Table 1: Distribution of patients surveyed and number with a questionable occlusal lesions (QOL) according to DPBRN Region¹

	AL/MS N	FL/GA ² N	MN/HP N	KP/PDA N	DK N	TOTAL N
Number of practitioners	10	20	13	15	25	83
Number of patients	890	1,526	988	1,074	2,432	6,910
Questionable occlusal lesions (QOL)						
Number of patients ³ with QOL	368	641	379	169	755	2,312
% of patients with QOL	41.3%	42.0%	38.4%	15.7%	31.0%	33.5%

¹AL/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 DK: Denmark.

²Consecutive patient log not available for one FL/GA practice. Only patients with an unrestored occlusal surface are included in counts.

³All of these patients did not participate.

Table 2: Distribution of DPBRN practitioner-investigators, participating patients and enrolled lesions according to DPBRN region

	AL/MS		FL/GA		MN/HP		KP/PDA		DK ²		TOTAL	
	N	% ¹	N	%	N	%	N	%	N	%	N	%
Dentists	10	12.0	20	24.0	13	15.7	15	18.1	25	30.1	83	100
Patients	296	16.7	477	27.0	296	16.7	106	6.0	593	33.5	1,768	100
Lesions	431	16.0	699	26.0	439	16.3	169	6.3	949	35.3	2,687	100
Excluding 17 lesions, 14 patients, with missing (N=11) or invalid tooth number (N=6)												
Patients	292	16.5	470	26.6	296	16.8	106	6.0	590	33.4	1,754	100
Lesions	425	15.9	692	25.9	438	16.4	169	6.3	946	35.4	2,670	100

¹Percentages for this table only are within rows for each variable.

²One Denmark practice had a prevalence of zero, thus no enrolled lesions

Results that follow are of 1,754 participating patients and 2,670 enrolled lesions:

Enrolled lesions are from a total of 82 practitioner-investigators instead of 83 due to one dentist from Denmark having a prevalence of zero.

Questions asked regarding the characteristics of the patients enrolled with questionable occlusal lesions.

1. Patient Gender

- a Male
- b Female

2. Patient age in years

Table 3A: Characteristics of patients with enrolled lesions by DPBRN region

	AL/MS		FL/GA		MN/HP		KP/PDA		DK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Gender												
Male	120	41.1	237	50.4	127	43.1	43	40.6	300	51.0	827	47.2
Female	172	58.9	233	49.6	168	57.0	63	59.4	288	49.0	924	52.8
Age (years)												
Mean	29.8		36.6		33.3		29.1		32.2		33.0	
(SD)	(18.4)		(18.0)		(17.7)		(16.1)		(16.7)		(17.6)	
(min-max)	(7-85)		(7-83)		(5-92)		(6-83)		(6-82)		(5-92)	
<= 12 years	56	19.2	37	7.9	35	11.8	12	11.3	68	11.5	208	11.9
13 – 18 years	69	23.6	60	12.8	39	13.2	23	21.7	74	12.5	265	15.1
19 – 44 years	89	30.5	216	46.1	134	45.3	53	50.0	320	54.2	812	46.3
45 – 64 years	68	23.3	126	26.9	78	26.4	15	14.2	102	17.3	389	22.2
>= 65 years	10	3.4	30	6.4	10	3.4	3	2.8	26	4.4	79	4.5

- Overall, 53% of enrolled patients were female, lower for FL/GA and DK.
- The average age was 33 years, with AL/MS & KP/PDA being slightly younger and FL/GA, older.

3. Patient ethnicity

- a not reported or unknown (I do not wish to provide this information)
- b Hispanic or Latino
- c Not Hispanic or Latino

Table 3B: Characteristics of patients with enrolled lesions by DPBRN region

	AL/MS		FL/GA		MN/HP		KP/PDA		SK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Ethnicity												
Missing	0	0.0	19	4.0	42	14.2	7	6.6	104	17.6	172	9.8
Among Available												
	N=292		N=451		N=254		N=99		N=486		N=1,582	
Hispanic\Latino	4	1.4	69	15.3	16	6.3	4	4.0	8	1.6	101	6.4
Not Hispanic\Latino	288	98.6	382	84.7	238	93.7	95	96.0	478	98.4	1481	93.6

- 6% of patients whose ethnicity was available were of Hispanic/Latino ethnicity, notably higher in FL/GA.

4. Patient race

- a not reported or unknown (I do not wish to provide this information)
- b White
- c Black or African-American
- d American Indian or Alaska Native
- e Asian
- f Native Hawaiian or Other Pacific Islander
- g Other (please specify) _____

Table 3C: Characteristics of patients with enrolled lesions by DPBRN region

	AL/MS		FL/GA		MN/HP		KP/PDA		DK		TOTAL	
	N= 292		N=470		N=296		N=106		N=590		N=1,754	
	N	%	N	%	N	%	N	%	N	%	N	%
Race												
Missing	4	1.4	19	4.0	33	11.2	6	5.7	39	6.6	101	5.8
Among Available	N=288		N=451		N=263		N=100		N=551		N=1,653	
White	212	73.6	344	76.3	215	81.7	86	86.0	532	96.6	1389	83.5
African-American	69	24.0	85	18.8	36	13.7	5	5.0	3	0.5	198	11.9
Am. Indian/Alaska	2	0.7	1	0.2	1	0.4	2	2.0	0	0.0	6	0.4
Asian	1	0.3	9	2.0	8	3.0	4	4.0	13	2.4	35	2.1
Hawaiian or Islander	1	0.3	1	0.2	0	0.0	1	1.0	0	0.0	3	0.2
Other	3	1.0	11	2.4	3	1.1	2	2.0	3	0.5	22	1.3

- About 84% of patients were White, 12% Black/African-American, with considerable differences by region: DK 97% White, and FL/GA, AL/MS being 19-24% Black/ African-American.

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

- a No
- b Yes

Table 3D: Characteristics of patients with enrolled lesions by DPBRN region

	AL/MS		FL/GA		MN/HP		KP/PDA		DK		TOTAL	
	N		N		N		N		N		N	
	N	%	N	%	N	%	N	%	N	%	N	%
Insurance												
No	34	11.6	117	25.0	27	9.1	4	3.8	0	0.0	182	10.4
Yes	258	88.4	351	75.0	269	90.9	102	96.2	589	100.0	1,569	89.6

- Overall, 90% had some type of dental insurance; all of DK and only 75% of FL/GA.

Table 4: Tooth position* by DPBRN region

Tooth Position	AL/MS		FL/GA		MN/HP		KP/PDA		DK		TOTAL	
	N=425		N=692		N=438		N=169		N=946		N=2,670	
	N	%	N	%	N	%	N	%	N	%	N	%
Premolar												
Premolar	155	36.5	247	35.7	126	28.8	37	21.9	267	28.2	832	31.2
Molar	270	63.5	445	64.3	312	71.2	132	78.1	679	71.8	1838	68.8
Premolars												
Maxillary	62	40.0	119	48.2	50	39.7	20	54.1	104	39.0	355	42.7
Mandibular	93	60.0	128	51.8	76	60.3	17	46.0	163	61.1	477	57.3
First	63	40.7	120	48.6	61	48.4	18	48.7	109	40.8	371	44.6
Second	92	59.4	127	51.4	65	51.6	19	51.4	158	59.2	461	55.4
Molars												
Maxillary	125	46.3	238	53.5	157	50.3	64	48.5	345	50.8	929	50.5
Mandibular	145	53.7	207	46.5	155	49.7	68	51.5	334	49.2	909	49.5
First	113	41.9	169	38.0	129	41.4	39	29.5	223	32.8	673	36.6
Second	136	50.4	243	54.6	153	49.0	87	65.9	360	53.0	979	53.3
Third	21	7.8	33	7.4	30	9.6	6	4.6	96	14.1	186	10.1

*Classification according to US Tooth numbers:

Premolar (4, 5, 12, 13, 20, 21, 28, 29), Molar (1-3, 14-16, 17-19, 30-32)

Premolar: maxillary (4-5, 12-13), mandibular (20-21, 28-29), 1st (5, 12, 21, 28), 2nd (4, 13, 20, 29)

Molar: maxillary (1-3, 14-16), mandibular (17-19, 30-32), 1st (3, 14, 19, 30), 2nd (2, 15, 18, 31), 3rd (1, 16, 17, 32)

- 31% of lesions involved premolars, lower in KP/PDA (22%) and higher in AL/MS and FL/GA, 36%.
- Among lesion involving premolars, 43% were maxillary and 45% were 1st premolars, similar across regions.
- Among lesions involving molars
 - equal with regard to maxillary or mandibular, similar across regions, in contrast:
 - 37% were 1st, 53% were 2nd, and 10% were 3rd molars, differing across regions, especially 3rd molars: low of 5% in KP/PDA, high of 14% in DK, with the remaining ranging 7-10%

7. Which **one** best describes the luster of the questionable area?

- a Chalky appearance
 b Shiny appearance

8. Which **one** best describes the color of the questionable area?

- a Opaque
 b White spot
 c Yellow/light brown discoloration
 d Dark brown/black discoloration
 e Other _____

9. Is the questionable area associated with a fissure or pit?

- a No
 b Yes – limited to the pit or fissure
 c Yes – extending beyond the pit or fissure

Table 5: Description of questionable area by DPBRN region

	AL/MS		FL/GA		MN/HP		KP/PDA		DK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Appearance of Luster												
Chalky	152	36.4	218	31.7	199	45.4	98	58.0	639	67.6	1,306	49.1
Shiny	266	63.6	470	68.3	239	54.6	71	42.0	307	32.5	1,353	50.9
Color of area												
Opaque	66	16.4	51	7.4	16	3.7	20	11.9	79	8.4	232	8.8
White spot	23	5.7	17	2.5	20	4.6	16	9.5	82	8.7	158	6.0
Yellow/light brown	188	46.8	304	44.2	232	53.0	65	38.7	450	47.9	1,239	47.0
Dark brown/black	125	31.1	298	43.3	167	38.1	65	38.7	328	34.9	983	37.3
Other	0	0.0	18	2.6	3	0.7	2	1.2	1	0.1	24	0.9
Associated with fissure or pit												
No	5	1.2	17	2.5	8	1.8	1	0.6	11	1.2	42	1.6
Yes - limited to pit/fissure	345	81.6	615	89.4	416	95.4	161	95.3	828	87.5	2,365	88.8
Yes - beyond pit/fissure	73	17.3	56	8.1	12	2.8	7	4.1	107	11.3	255	9.6

- Overall, about half of the lesions had a chalky and half had a shiny luster; this differed across regions. FL/GA and ALMS had only 32-36% with a chalky luster compared to 67% in DK.
- Most common color of lesion was yellow/light brown, 47%, followed by dark brown/black, 37%, with much fewer being opaque (9%) or white (6%). Though these percents differed across region, the “ranking” varied very little, namely, yellow/light brown was always most common either followed by or tied with dark brown/black.
- Nearly 90% had a limited association with a fissure or pit, ranged from 82% in AL/MS to 95% in MN/HP and KP/PDA.

10. Which aids were used in **making (not confirming)** the diagnosis? (Check all that apply, *thus column percents can sum to over 100%*)

- a Magnification
- b Air drying
- c **Dental explorer**
- d Laser fluorescence such as DIAGNOdent®
- e Caries Detecting Dye
- f Radiographs
- g Transillumination

Table 6(A): Aids used in making the diagnosis by DPBRN region

	AL/MS		FL/GA		MN/HP		KP/PDA		DK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Magnification	256	60.2	456	66.0	370	84.5	89	52.7	88	9.3	1,259	47.2
Air drying	389	91.8	637	92.1	381	87.0	160	94.7	942	99.7	2,509	94.0
Laser fluorescence	25	6.0	42	6.1	1	0.2	1	0.6	0	0	69	2.6
Caries detecting dye	49	11.5	3	0.4	5	1.1	0	0	1	0.1	58	2.2
Radiographs	133	31.3	208	30.1	279	63.7	77	45.6	436	46.1	1,133	42.5
Transillumination	4	0.9	6	0.9	2	0.5	2	1.2	24	2.5	38	1.4
Dental Explorer	416	98.1	648	93.8	430	98.2	165	97.6	765	80.9	2,424	90.8

- Air drying and dental explorer were by far the most common aids used in diagnosing these lesions. Air drying was used in 94% of lesions (range 87% in KP/PDA to 99.7% in DK) and dental explorer in 91% (range 81% in DK to 98% in AL/MS and MN/HP).
- Radiographs were next most commonly used aid – used in less than half, 42% of lesions.
- Laser fluorescence was used almost solely by AL/MS and FL/GA, and in only 6%, and caries detecting dye was use almost solely in AL/MS, in 11%.

11. **When you used a dental explorer**, did you experience roughness of the enamel surface upon light exploration?

- a No
- b Yes

12. **When you used a dental explorer**, did you experience retention of the explorer in a groove or fissure?

- a No
- b Yes-Slight stick
- c Yes-Resistance to removal

Table 6(B): Experiences using dental explorer by DPBRN region.

	AL/MS		FL/GA		MN/HP		KP/PDA		DK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Roughness												
No	160	38.7	376	58.0	253	59.1	48	29.1	370	48.4	1,207	49.9
Yes	254	61.4	272	42.0	175	40.9	117	70.9	395	51.6	1,213	50.1
Retention												
No	186	44.9	369	57.0	286	66.7	69	41.8	613	80.1	1,523	62.9
Yes-slight stick	160	38.7	230	35.6	138	32.2	85	51.5	142	18.6	755	31.2
Yes-resistance	68	16.4	48	7.4	5	1.2	11	6.7	10	1.3	142	5.9

- Among lesions diagnosed with aid of dental explorer, half were “rough,” much higher in KP/PDA (71%) than MN/HP or FL/GA (41-42%).
- Among lesions diagnosed with aid of dental explorer, in 63% no retention was noted, 31% slight, and 6% definite resistance. This differed considerably across regions, e.g., in AL/MS, 16% presented definite resistance to removal compared to only 1.2% in MN/HP.

For questions 13 –18, how would you characterize the patient's dental history in the following areas? (Check one answer per question).

13. Caries

- a No caries lesions treated in the past 2 years
- b 1-2 caries lesions treated in the past 2 years
- c 3 or more lesions treated in the past 2 years

14. Recall

- a Regular recall care intervals
- b Irregular recall care interval

15. Homecare

- a Good oral self-care
- b Fair oral self-care
- c Poor oral self-care

16. Restorations

- a Has restorations
- b Does not have restorations

17. Fluoride

- a Optimal FI level (inc FI toothpaste) or receives FI treatments
- b Suboptimal FI level and does not receive FI treatment

18. Miscellaneous (Check all that apply)

- a Cariogenic Diet
- b Medication/Disease induced xerostomia/hyposalivation
- c Active Orthodontic treatment

Table 7: Patient's dental history by DPBRN region

	AL/MS		FL/GA		MN/HP		KP/PDA		DK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Caries												
0 caries past 2 years	174	60.2	278	59.7	129	43.7	62	58.5	332	56.3	975	55.8
1-2 caries past 2 years	78	26.9	142	30.5	103	34.9	27	25.5	195	33.1	545	31.2
3+ caries past 2 years	37	12.8	46	9.9	63	21.4	17	16.0	63	10.7	226	12.9
Recall												
Regular recall intervals	221	76.0	382	82.0	215	73.4	84	80.8	536	90.9	1,438	82.5
Irregular recall intervals	70	24.1	84	18.0	78	26.6	20	19.2	54	9.2	306	17.6
Homecare												
Good oral self-care	169	58.3	310	66.1	175	59.1	60	56.6	305	51.8	1,019	58.2
Fair oral self-care	98	33.8	138	29.4	97	32.8	39	36.8	248	42.1	620	35.4
Poor oral self-care	23	7.9	21	4.5	24	8.1	7	6.6	36	6.1	111	6.3
Restorations												
Has restorations	256	87.7	402	85.5	247	83.5	82	77.4	474	80.3	1,461	83.3
No restorations	36	12.3	68	14.5	49	16.6	24	22.6	116	19.7	293	16.7
Fluoride												
Optimal FI level	246	85.1	425	91.0	268	91.2	89	84.0	584	99.2	1,612	92.4
Suboptimal FI level	43	14.9	42	9.0	26	8.8	17	16.0	5	0.9	133	7.6
Miscellaneous (Check all that apply)												
Cariogenic Diet	192	65.8	64	13.6	73	24.7	37	34.9	74	12.5	440	25.1
Medication*	8	2.7	7	1.5	8	2.7	3	2.8	6	1.0	32	1.8
Orthodontic Treatment	7	2.4	10	2.1	0	0.0	3	2.8	6	1.0	26	1.5

*Medication, xerostomia, or hyposalivation

They all differed across regions.

- Overall, in the prior 2 years, 57% had no caries, 31% had 1-2, and 13% had 3 or more caries. MN/HP had the only 44% with no caries and 22% with 3 or more.
- Nearly 83% had regular recall intervals, highest in DK (91%) and lowest in MN/HP (71%).
- 58% had good oral self care, 35% fair and 6% poor. FL/GA had the best profile for oral self-care.
- 82% had some restorations, ranging from 75% in KP/PDA to 87% in AL/MS.
- 7% had suboptimal FL level, higher in AL/MS and KP/PDA (13-15%) and lowest in DK (<1%).
- 24% ate a cariogenic diet, much higher in AL/MS (62%) and lower in FL/GA and KP/PDA (12-13%).
- Medication and orthodontic treatment were quite rare, <2% overall.

19. I chose to treat the tooth today by: (Please check all that apply)

- a Monitoring
- b Oral hygiene instruction
- c Applying/prescribing fluoride
- d Applying varnish
- e Sealant placement (etch tooth with **no** preparation, with sealant material/composite resin placed over it)

- f Enameloplasty (removing superficial grooves and other defects with or without fluoride/resin material)
- g Preventive Resin Restoration (i.e. minimal tooth preparation, composite resin placed, with sealant material placed over it)
- h Full Restoration

- i Other _____

If you chose a,b,c, d, or e please **STOP**

Table 8: Patient treatment by DPBRN region

	AL/MS		FL/GA		MN/HP		KP/PDA		DK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Monitoring	274	64.5	528	76.3	370	84.5	24	14.2	684	72.3	1,880	70.4
Oral hygiene	173	40.7	238	34.4	188	42.9	11	6.5	619	65.4	1,229	46.0
Fluoride	156	36.7	67	9.7	76	17.4	7	4.1	227	24.0	533	20.0
Applying varnish	8	1.9	10	1.5	51	11.6	16	9.5	32	3.4	117	4.4
Sealant placement	45	10.6	34	4.9	58	13.2	57	33.7	161	17.0	355	13.3
Enameloplasty	2	0.5	56	8.1	15	3.4	43	25.4	0	0.0	116	4.3
Preventive Resin	4	0.9	21	3.0	2	0.5	19	11.2	0	0.0	46	1.7
Full restoration	104	24.5	67	9.7	13	3.0	25	14.8	7	0.7	216	8.1
Any restorations*	110	25.9	140	20.2	30	6.9	87	0.7	7	0.7	374	14.0

Among patients receiving some type of restorative treatment

Enameloplasty	2	1.8	56	40.0	15	50.0	43	49.4	0	0.0	116	31.0
Preventive Resin	4	3.6	21	15.0	2	6.7	19	21.8	0	0.0	46	12.3
Full restoration	104	94.6	67	47.9	13	43.3	25	28.7	7	100.0	216	57.8

*Any restorations: enameloplasty, preventive resin restoration, or full restoration

- Monitoring was the most common (70%) treatment option indicated, followed by oral hygiene instruction (46%). Applying varnish was the non-restorative option indicated by fewest practitioners (4%).
- 14% of lesions were treated with some type of restoration, with full-restoration being most common choice of restorative treatment, 8% overall and 58% of restorative treatments.
- There was substantial variation in treatment of these lesions across regions, e.g., monitoring was indicated by 72-76% of practitioners in FL/GA and DK but by only 14% in KP/PDA. Any type of restorative treatment ranged from <1% in DK to 26% in AL/MS.

20. If you chose to restore this tooth, what did you find?

- a No caries
- b Inactive/ re-mineralized caries
- c Active caries (Outer ½ of Enamel)
- d Active caries (Inner ½ of Enamel)
- e Active caries (Outer ⅓ of Dentin)
- f Active caries (Middle ⅓ of Dentin)
- g Active caries (Inner ⅓ of Dentin)

Table 9: Restoration findings by DPBRN region

	AL/MS		FL/GA		MN/HP		KP/PDA		DK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
No caries	5	5.1	22	15.7	4	22.2	27	31.0	0	0.0	58	16.6
Inactive	1	1.0	12	8.6	0	0.0	20	23.0	0	0.0	33	9.4
Active	92	93.9	106	75.7	14	77.8	40	46.0	7	100.0	259	74.0
<u>Among active</u>												
Enamel	6	6.5	41	38.7	1	7.1	16	40.0	6	86.7	70	27.0
Dentin	86	93.5	65	61.3	13	92.9	24	60.0	1	14.3	189	73.0
<u>Enamel</u>												
Outer 1/2	0	0.0	22	53.7	0	0.0	7	43.8	6	100.0	35	50.0
Inner 1/2	6	100.0	19	46.3	1	100.0	9	56.3	0	0.0	35	50.0
<u>Dentin</u>												
Outer 1/3	34	39.5	41	63.1	9	69.2	19	79.2	1	100.0	104	55.0
Middle 1/3	19	22.1	22	33.9	4	30.8	4	16.7	0	0.0	49	25.9
Inner 1/3	33	38.4	2	3.1	0	0.0	1	4.2	0	0.0	36	19.1

- Of lesions which had some type of restorative treatment, 74% had active decay, of these 27% were within the enamel.
- There was substantial variation across region regarding findings, e.g., percent with active decay ranged from 46% in KP/PDA to 94-100% in AL/MS and DK. Similarly, among those with active decay, percent within the enamel ranged from 6.5% in AL/MS to 87% in DK.

21. If you chose to restore this tooth, what type of material did you use?

- a Amalgam
- b Composite
- c Glass ionomer
- d Other _____

Table 10: Type of restoration material used by DPBRN region

	AL/MS		FL/GA		MN/HP		KP/PDA		DK		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
Amalgam	7	6.7	7	5.2	8	44.4	8	9.6	0	0.0	30	8.6
Composite	95	91.4	123	90.4	6	33.3	32	38.6	7	100.0	263	75.6
Glass ionomer	2	1.9	1	0.7	0	0.0	10	12.1	0	0.0	13	3.7
Other	0	0.0	5	3.7	4	22.2	33	39.8	0	0.0	42	12.1

- Composite was used in 76% of lesions restored; this differed by region in that 3 regions used it almost exclusively, while 2 used it in only 30-39% of lesions.