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Effects of Cariogenic Bacteria and Sealant Evaluated by International Caries Detection Assessment System

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Abstract:

Aim:

Evaluation of tooth surface level effect of cariogenic bacteria and sealant.

Background:

International Caries Detection Assessment System (ICADS) is a clinical scoring system that can assess the non-cavitated early stage of dental caries by surface level. Scores used in ICDAS are ordinary and each tooth within one individual is not statistically independent.

Objective:

In this study, by applying mixed effect modeling, the effect of cariogenic bacteria and fissure sealant for tooth surface-level caries progression was analyzed.

Methods:

Ninety-eight patients who had been regularly visited the dental hospital for the regular check-ups were enrolled in this study. Among them, patients who visited at baseline, after one and two years, were included for the analysis. Fifty-two patients were dropped out. The study population consisted of 25 boys and 21 girls and their mean ages were 9.3 +/- 2.1. Salivary levels of cariogenic bacteria were measured by qPCR. Mixed effect modeling with repeated measures was applied for the analysis.

Results:

Salivary levels of *S. mutans* and *Lactobacilli* were affected by the progression of the ICDAS score. Maxillary teeth, molars and buccal and occlusal surfaces were tended to progress. Maxillary tooth, molar tooth and buccal, approximal, and occlusal surface were tended to be affected by both cariogenic bacteria.

Conclusion:

By applying mixed effect modeling, highly-detailed surface-level analysis can be available.

Keywords: ICDAS, Mixed effects modeling, Cariogenic bacteria, Fissure sealant, Follow up study, Dental caries.

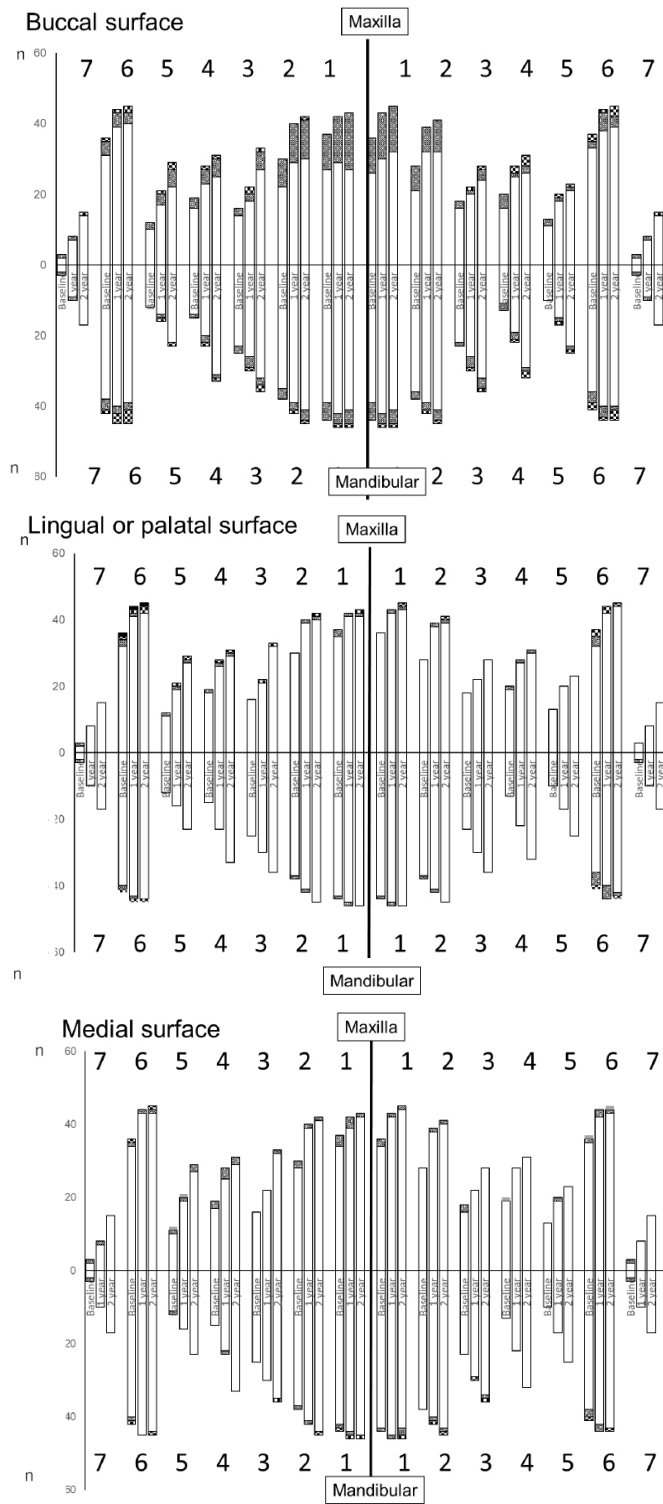
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SUPPLEMENTARY TABLES AND FIGURE



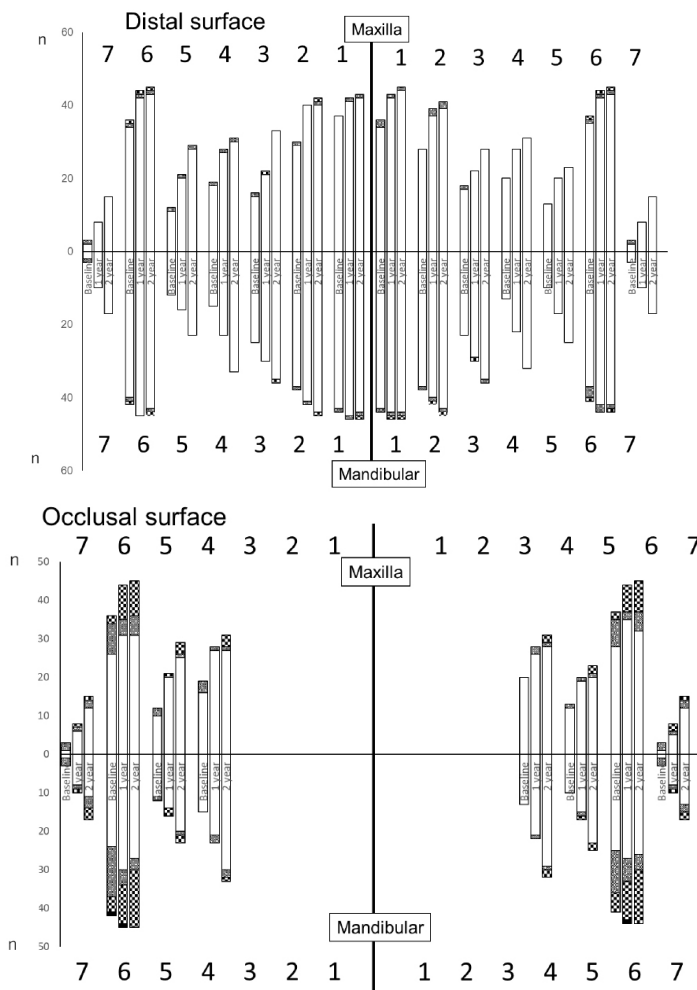


Fig. (S1). Prevalence of dental caries classified by tooth surface. Results were separately shown by tooth surface: Buccal surface, lingual or palatal surface, medial surface distal surface and occlusal surface. Bar charts show the number of dental caries evaluated by the ICDAS score. Most of the teeth surfaces were complete. For the lingual or palatal surface and approximal surface, the prevalence of dental caries evaluated by the ICDAS score was rare. A relatively higher prevalence of dental caries was observed in maxillary anterior tooth and occlusal surface of 1st molar tooth.

Supplementary Table 1. Descriptive analysis of the characteristics of the subjects analyzed in this study and prevalence of dental caries evaluated by ICADS against tooth surface.

		Mean	SD	Median	25 Percentile	75 Percentile
Age(Y/MM)	Baseline	9/3.22	2/ 1.24	9/ 0.50	8 / 4.75	10 /11.5
Stimulated saliva (mL/3min)	Baseline	2.71	2.99	2.00	1.50	3.50
	One year	3.00	2.03	2.75	1.50	4.00
	Two Year	3.29	1.93	3.00	2.00	5.00
<i>S. mutans</i>	Baseline	363462	706678	20149	0	419918
	One year	228673	401803	53823	463	291469
	Two Year	372400	722094	117365	0	347457
<i>Lactobacillus</i>	Baseline	320273	1126023	0	0	11153
	One year	3290808	16219415	0	0	285681
	Two Year	1860247	7796732	0	0	54152
def	Baseline	2.78	3.571	1	0	6
	One year	2.17	2.946	0	0	5
	Two Year	1.35	2.350	0	0	2

Supplementary Table 2. Characteristics of the tooth surface and changes of ICDAS score.

		After One Year				After Two Year			
		Stable	Progressed	Improved	Total	Stable	Progressed	Improved	Total
Gender		-							
Female	-	1226 (93.2%)	23 (1.7%)	66 (5.0%)	1315	1206(91.7%)	39 (3.0%)	70 (5.3%)	1315
Male	-	1432 (89.6%)	125 (7.8%)	41(2.6%)	1598	1438(90.0%)	119 (7.4%)	41 (2.6%)	1598
Maxilla Mandibular									
Mandibular	-	1444 (93.6%)	61 (4.0%)	38 (2.5%)	1543	1429(92.6%)	69 (4.5%)	45 (2.9%)	1543
Maxilla	-	1214 (88.6%)	87 (6.4%)	69 (5.0%)	1370	1215(88.7%)	89 (6.5%)	66 (4.8%)	1370
Tooth type									
Anterior	-	1447 (96.0%)	39 (2.6%)	22 (1.5%)	1508	1415(93.8%)	59 (3.9%)	34 (2.3%)	1508
Premolar	-	503 (89.0%)	43 (7.6%)	19 (3.4%)	565	512 (90.6%)	38 (6.7%)	15 (2.7%)	565
Molar	-	708 (84.3%)	66 (7.9%)	66 (7.9%)	840	717 (85.4%)	61 (7.3%)	62 (7.4%)	840
Tooth surface									
Lingual or Palatal		626 (95.1%)	55 (8.4%)	27 (4.1%)	658	623 (94.7%)	14 (2.1%)	21 (3.2%)	658
Buccal	-	576 (87.5%)	30 (4.6%)	39 (5.9%)	658	572 (86.9%)	57 (8.7%)	29 (4.4%)	658
Approximal	-	1247 (94.8%)	48 (3.6%)	24 (1.8%)	1316	1251 (95.1%)	28 (2.1%)	37 (2.8%)	1316
Occlusal	-	209 (74.4%)	15 (5.3%)	17 (6.0%)	281	198 (70.5%)	59 (21.0%)	24 (8.5%)	281
Cariogenic Bacteria									
<i>S. mutans</i>	-	730 (98.1%)	5 (0.7%)	9(1.2%)	744	730 (97.6%)	8 (1.1%)	10 (1.3%)	748
	+	1928 (88.9%)	143 (6.6%)	98 (4.5%)	2169	1914 (88.4%)	150 (6.9%)	101 (4.7%)	2165
LB	-	2066 (93.5%)	115 (5.2%)	29 (1.3%)	2210	2028 (91.9%)	125 (5.7%)	53 (2.4%)	2206
	+	592 (84.2%)	33 (4.7%)	78 (11.1%)	703	616 (87.1%)	33 (4.7%)	58 (8.2%)	707

P-values were not calculated, because there was a risk for type I error.

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