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Screening of Periodontal Pathogens in Infants and Children

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Introduction

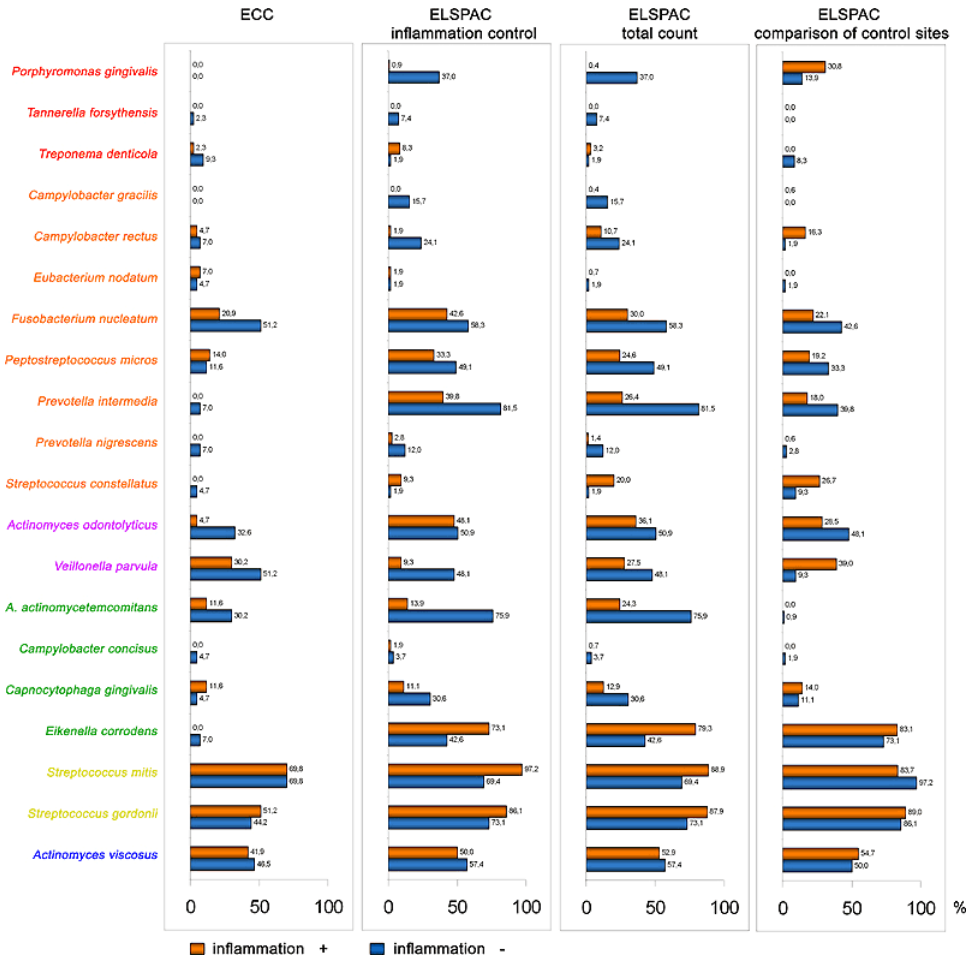
Objectives: Increasing number of evidence has shown the association of periodontal pathogens present in periodontal environment and periodontal pathologies in adults while so far existing data on the periodontal microbiology of infants and children have been limited. Some genomic microbiological studies published in the past few years have shown that some periodontopathic bacteria can be detected in saliva or in dental plaque i) even in infancy (Umeda et al. 2004), ii) in periodontally healthy children (Sakai et al. 2007) and iii) that their presence in childrens' mouths may be the result of intrafamiliar transmission (Ooshima et al. 2003). On the other hand the studies site specific prevalence of periodontopathic bacteria related to periodontal health and disease in children have brought so far some confusing results. The longitudinal study of 60 Brasilian children with mixed dentition did not show any significant differences related to gingival index score (Sakai et al. 2007) while other study from Japan showed some positive correlations between detection frequency of periodontopathic bacteria and the scores of both plaque and gingival indices (Ooshima et al. 2003).

Objectives

The aim of this study was to identify the known periodontal pathogens in infants with ECC and children from the ELSPAC project (European Longitudinal Study of Pregnancy and Childhood).

Material and Methods

Thirty-seven infants (mean age 4.06, SE=1.39) were hospitalized in the Children Teaching Hospital for the dental treatment under general anesthesia. The children (mean age 14.57, SE=0.83) from the ELSPAC project were clinically examined for dental, and periodontal status, hygiene and orthodontic anomalies. The sulcular fluid samples from both bleeding and healthy gingival sites were taken. The fluid from gingival sulcus was absorbed to endodontic paper points (ISO standard 40) and processed in the ParoCheck® kits (Greiner Bio-one GmBH, D). Bacterial species were identified by means of the hybridization in situ method using 16S rRNA fragment and highly conserved primer labelled by fluorophore (Cy5). Hybridized samples were labelled by strain specific DNA-sondes and identified according to ParoCheck®Report-Software. The findings on gingival bleeding and healthy sites were compared (chí² test; P=0.05).



Oral pathogens

Results

Infants - frequency in bleeding gingival sites (%): *A. actinomycetemcomitans* (AA) 30.2, *P. intermedia (PI)* 7.0, *F. nucleatum* (FN) 51.2, *T. denticola* (TD) 9.3, *T. forsythensis* (TF) 2.3, *P. nigrescens* (PN) 7.0, all significantly more frequently than in healthy sites (P<0.025). children - frequency in bleeding gingival sites (%): *P.gingivalis* (PG)37.0, *A. actinomycetemcomitans* (AA) 75.9, *P. intermedia* (PI) 81.5, *F. nucleatum* (FN) 58.3, *T.denticola* (TD) 1.9, *T.forsytensis* (TF) 7.4, *P. nigrescens* (PN) 12.0, all but FN and TF significantly more frequently than in healthy sites (P<0.025).

Inflammation	Sampling sites (No.)	Frequency	Percent	Sampling sites (No.)	Frequency	Percent
	P. gingivalis			*A. actinomycetemcomitans*		
+	43	0	0.0	43	13	30.2
-	43	0	0.0	43	5	11.6
P	-			0.031		
	P. intermedia			*F. nucleatum*		
+	43	3	7.0	43	22	51.2
-	43	0	0.0	43	9	20.9
P	0.121			0.003	**P<0.025**	
	E. corrodens			*T. denticola*		
+	43	3	7.0	43	4	9.3
-	43	0	0.0	43	1	2.3
P	0.121			0.152		
	A. viscosus			*T. forsythensis*		
+	43	20	46.5	43	1	2.3
-	43	18	41.9	43	0	0.0
P	0.414			0.500		
	C. rectus			*S. mitis*		
+	43	3	7.0	43	30	69.8
-	43	2	4.7	43	30	69.8
P	0.472			0.593		
	P. micros			*S. gordonii*		
+	43	5	11.6	43	19	44.2
-	43	6	14.0	43	22	51.2
P	0.500			0.333		
	P. nigrescens			*S. constellatus*		
+	43	3	7.0	43	2	4.7
-	43	0	0.0	43	0	0.0
P	0.121			0.247		
	V. parvula			*C. gingivalis*		
+	43	22	51.2	43	2	4.7
-	43	13	30.2	43	5	11.6
P	0.039			0.211		
	A. odontolyticus			*C. concisus*		
+	43	14	32.6	43	2	4.7
-	43	2	4.7	43	0	0.0
P	0.001	**P<0.025**		0.247		
	E. nodatum			*C. gracilis*		
+	43	2	4.7	43	0	0.0
-	43	3	7.0	43	0	0.0
P	0.472			-		

Oral pathogens in infants affected by ECC

Inflammation	Sampling sites (No.)	Frequency	Percent	Sampling sites (No.)	Frequency	Percent
	P. gingivalis			*A. actinomycetemcomitans*		
+	108	40	37.0	108	82	75.9
-	108	1	0.9	108	15	13.9
P	0.000	**P<0.025**		0.000	**P<0.025**	
	P. intermedia			*F. nucleatum*		
+	108	88	81.5	108	63	58.3
-	108	43	39.8	108	46	42.6
P	0.000	**P<0.025**		0.015	**P<0.025**	
	E. corrodens			*T. denticola*		
+	108	46	42.6	108	2	1.9
-	108	79	73.1	108	9	8.3
P	0.000	**P<0.025**		0.029		
	A. viscosus			*T. forsythensis*		
+	108	62	57.4	108	8	7.4
-	108	54	50.0	108	0	0.0
P	0.170			0.003	**P<0.025**	
	C. rectus			*S. mitis*		
+	108	26	24.1	108	75	69.4
-	108	2	1.9	108	105	97.2
P	0.000	**P<0.025**		0.000	**P<0.025**	
	P. micros			*S. gordonii*		
+	108	53	49.1	108	79	73.1
-	108	36	33.3	108	93	86.1
P	0.013	**P<0.025**		0.014	**P<0.025**	
	P. nigrescens			*S. constellatus*		
+	108	13	12.0	108	2	1.9
-	108	3	2.8	108	10	9.3
P	0.008	**P<0.025**		0.017	**P<0.025**	
	V. parvula			*C. gingivalis*		
+	108	52	48.1	108	33	30.6
-	108	10	9.3	108	12	11.1
P	0.000	**P<0.025**		0.000	**P<0.025**	
	A. odontolyticus			*C. concisus*		
+	108	55	50.9	108	4	3.7
-	108	52	48.1	108	2	1.9
P	0.393			0.327		
	E. nodatum			*C. gracilis*		
+	108	2	1.9	108	17	15.7
-	108	2	1.9	108	0	0.0
P	0.629			0.000	**P<0.025**	

Oral pathogens in ELSPAC group Pairs : inflammation-control

Inflammation	Sampling sites (No.)	Frequency	Percent	Sampling sites (No.)	Frequency	Percent
	P. gingivalis			*A. actinomycetemcomitans*		
+	108	40	37.0	108	82	75.9
-	280	1	0.4	280	68	24.3
P	0.000	**P<0.025**		0.000	**P<0.025**	
	P. intermedia			*F. nucleatum*		
+	108	88	81.5	108	63	58.3
-	280	74	26.4	280	84	30.0
P	0.000	**P<0.025**		0.000	**P<0.025**	
	E. corrodens			*T. denticola*		
+	108	46	42.6	108	2	1.9
-	280	222	79.3	280	9	3.2
P	0.000	**P<0.025**		0.342		
	A. viscosus			*T. forsythensis*		
+	108	62	57.4	108	8	7.4
-	280	148	52.9	280	0	0.0
P	0.245			**0.000**	**P<0.025**	
	C. rectus			*S. mitis*		
+	108	26	24.1	108	75	69.4
-	280	30	10.7	280	249	88.9
P	**0.001**	**P<0.025**		0.000	**P<0.025**	
	P. micros			*S. gordonii*		
+	108	53	49.1	108	79	73.1
-	280	69	24.6	280	246	87.9
P	0.000	**P<0.025**		0.001	**P<0.025**	
	P. nigrescens			*S. constellatus*		
+	108	13	12.0	108	2	1.9
-	280	4	1.4	280	56	20.0
P	0.000	**P<0.025**		0.000	**P<0.025**	
	V. parvula			*C. gingivalis*		
+	108	52	48.1	108	33	30.6
-	280	77	27.5	280	36	12.9
P	0.000	**P<0.025**		0.000	**P<0.025**	
	A. odontolyticus			*C. concisus*		
+	108	55	50.9	108	4	3.7
-	280	101	36.1	280	2	0.7
P	0.005	**P<0.025**		0.053		
	E. nodatum			*C. gracilis*		
+	108	2	1.9	108	17	15.7
-	280	2	0.7	280	1	0.4
P	0.304			0.005	**P<0.025**	

Inflammation	Sampling sites (No.)	Frequency	Percent	Sampling sites (No.)	Frequency	Percent
	P. gingivalis			*A. actinomycetemcomitans*		
+	108	15	13.9	108	1	0.9
-	172	53	30.8	172	0	0.0
P	0.001	**P<0.025**		0.386		
	P. intermedia			*F. nucleatum*		
+	108	43	39.8	108	46	42.6
-	172	31	18.0	172	38	22.1
P	0.000	**P<0.025**		0.000	**P<0.025**	
	E. corrodens			*T. denticola*		
+	108	79	73.1	108	9	8.3
-	172	143	83.1	172	0	0.0
P	0.033			0.000	**P<0.025**	
	A. viscosus			*T. forsythensis*		
+	108	54	50.0	108	0	0.0
-	172	94	54.7	172	0	0.0
P	0.262			?		
	C. rectus			*S. mitis*		
+	108	2	1.9	108	105	97.2
-	172	28	16.3	172	144	83.7
P	0.000	**P<0.025**		0.000	**P<0.025**	
	P. micros			*S. gordonii*		
+	108	36	33.3	108	93	86.1
-	172	33	19.2	172	153	89.0
P	0.006	**P<0.025**		0.299		
	P. nigrescens			*S. constellatus*		
+	108	3	2.8	108	10	9.3
-	172	1	0.6	172	46	26.7
P	0.140			0.000	**P<0.025**	
	V. parvula			C. gingivalis		
+	108	10	9.3	108	12	11.1
-	172	67	39.0	172	24	14.0
P	0.000	**P<0.025**		0.309		
	A. odontolyticus			*C. concisus*		
+	108	52	48.1	108	2	1.9
-	172	49	28.5	172	0	0.0
P	0.001	**P<0.025**		0.148		
	E. nodatum			*C. gracilis*		
+	108	2	1.9	108	0	0.0
-	172	0	0.0	172	1	0.6
P	0.148			0.614		

Oral pathogens in ELSPAC group, Total count

Oral pathogens in ELSPAC group, Total count, comparison of contol sites

Conclusions

The above microbiological findings showed the significant correlations between the detection frequency of some periodontopathic bacteria and gingival pathology in both infants and children. The spectrum and the frequency of periodontopathic bacteria detected in infants was narrower than that seen in children and some of them (PG) have not been found in any of infants examined. It is in accordance with findings of Kimura et al. (2002) that found the colonization of many putative periodontopathic microorganisms to occur quite early in childhood without clinical signs of periodontal disease however, colonization by P. gingivalis was not detected in periodontally healthy preschool children. Supported by grant IGA Min. of Health No. NR/8394-3 and by Project 1M0528 from the Ministry of Education

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