

PERIODONTITIS

Interaction factor	Periodontitis		Unadjusted logistic model for CIS	
	yes	no	OR (95% CI)	P-value for interaction
PFO	N of CIS patients (controls)			0.3421
No	14 (20)	30 (66)	3.004 (0.216–2.734)	
Yes	25 (9)	73 (45)	1.815 (0.736–4.954)	

Table 3. Patent foramen ovale status as a moderator in the association between periodontitis and cryptogenic ischemic stroke.

RESULTS

CIS was associated with periodontitis (at least stage III and grade B; odds ratio 4.11; confidence interval 1.15–14.6) and with recent invasive dental procedures (2.54; 1.01–6.39). In interaction analysis,

association with recent invasive dental procedures was strong for those with PFO (6.26; 1.72–40.3), but not for those without PFO. The presence of PFO did not interact with periodontitis status.

CONCLUSIONS

Periodontitis and recent invasive dental procedures are associated with CIS. Interestingly, PFO status moderates the association with recent invasive dental procedures, but not with periodontitis.

jaakko.leskela@helsinki.fi
www.secretostudy.net



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Periodontitis is a disease affecting tooth supporting tissue, mediated by chronic oral infection and inflammation. Periodontitis is an independent risk factor for cardiovascular diseases, but the evidence is incomplete for cryptogenic ischemic stroke (CIS) in the young. Invasive dental procedures are known to cause transient bacteremia, potentially triggering systemic inflammatory responses. We investigated the relationship between CIS, periodontitis, and recent dental procedures and if the associations are moderated by the patent foramen ovale (PFO) status.

METHODS

18–49-year-old Finnish CIS patients (n=146) and their age- and sex-matched controls were examined by a senior periodontologist approximately three months after the CIS incidence. Recent invasive dental procedures within three months before the incidence (or recruitment for controls) were asked in a questionnaire. Statistical analysis used conditional logistic regression adjusted for age, waist-to-hip ratio, smoking, PFO status, regular dentist visits, and hypertension status. Interaction analysis used logistic regression models adjusted for age and sex.

PERIODONTITIS

	CIS Patients (n=146)	Controls (n=146)	p-value
<i>Male sex</i>	85 (58.2)	85 (58.2)	
<i>Age</i>	41.2 (35.7–46.1)	42.1 (35.2–46.5)	0.233
<i>Education</i>			<0.001
<i>primary or secondary education</i>	79 (54.1)	49 (34.5)	
<i>higher education</i>	67 (45.9)	93 (65.5)	
<i>Obesity</i>	78 (53.4)	69 (47.3)	0.308
<i>Smoking, ever</i>	72 (49.3)	61 (41.8)	0.229
<i>Heavy alcohol consumption</i>	36 (26.5)	20 (14.2)	0.055
<i>Hypertension</i>	38 (26)	25 (17.1)	0.093
<i>Regular dentist visits</i>	77 (52.7)	92 (63.0)	0.101
<i>Patent foramen ovale</i>	101 (69.2)	56 (39.4)	<0.001

Table 1. Characteristics of the study population. Data expressed as median (interquartile range) or n (%).

RECENT DENTAL PROCEDURES

Interaction factor	Invasive dental treatment		Unadjusted logistic model for CIS	
	within 3 months	no	OR (95% CI)	P-value for interaction
PFO	N of CIS patients (controls)			0.009
No	4 (9)	41 (77)	0.835 (0.216–2.734)	
Yes	19 (2)	82 (54)	6.256 (1.722–40.27)	

Table 2. Patent foramen ovale status as a moderator in the association between recent dental procedures and cryptogenic ischemic stroke.

CONCLUSIONS