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study

Tooth loss: a family affair?

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Background

Genetics is a risk factor for the development of periodontitis, with more than 20 genes shown to be involved in the process. These findings have been confirmed by several twin studies that assessed the genetic component in early-onset periodontal disease. Although genetic factors also play a role in later-onset periodontitis, environmental and lifestyle factors most likely play a more important role in these cases.

Family studies have shown a higher risk for periodontitis in certain families, but these studies are limited by their inability to distinguish between genetic and environmental risk factors.

One of the main objectives of periodontal therapy is preventing tooth loss, and programmes of periodontal maintenance have shown good long-term results. There is, however, no evidence about whether these results also apply to patients whose family members have a history of periodontal disease.

A small rural community where there is detailed knowledge of the periodontal situation of the population could provide the setting for a good study design.

Aims

The aim of this study was to investigate the effect of familial tendency for periodontal disease on tooth loss after periodontal therapy in two generations, comparing a test group of patients with family members who have a history of periodontal disease and a matched control group.

Materials & methods

- A specialised periodontal practice, certified by the Norwegian Board of Health Supervision, started documenting periodontally treated patients in 1986. These patients originated from a single Norwegian rural community and ethnic group, and number between 25,000 and 30,000 people.
- Patients enrolled in a periodontal-maintenance system (≥ 5 years) were included and 124 families, 148 parents, and 154 children were identified. At the end of this study, 72 parents and 61 children were included in the long-term observations.
- The distinction was made between the test group – people with a close family member who had periodontal treatment or disease in the past – and the control group, which comprised patients treated for periodontal disease but who did not have any close family members with a history of periodontal diseases or periodontal treatment.
- Patients in the control group, parents and children, were matched with parents and children in the test group.
- A total of 266 of the 435 patients initially included could be followed long-term (≥ 5 years). The study ended in 2017 for both groups.
- In this study, no inter-generational transmission of periodontal-therapy outcomes was performed. The design allowed only the comparison in outcome between test groups separately for the older and younger age groups studied (parents and children).

Table: The effect of having a history of periodontal disease among close relatives on the number of teeth lost due to periodontal disease

Variable	Parent generation		Children generation	
	I	II	III	IV
Test group				
Periodontal disease among close relatives = 1	1.29*	1.02*	0.44*	0.61*
Standard error	(0.44)	(0.44)	(0.22)	(0.20)
95% confidence interval	[0.41–2.16]	[0.15–1.88]	[0.01–0.87]	[0.20–1.01]
Matching variables included	No	Yes	No	Yes
Number of observations	144	144	122	122

Note: Regression coefficients with standard errors and 95% confidence intervals.

* $p < .05$.

Results

Descriptive statistics:

- The matching variables confirmed that test and control groups were similar regarding the risk and prognostic factors that influence the outcome of periodontal therapy.
- In the parent generation, subjects who had a close relative with a history of periodontitis lost 1.94 teeth, compared to 0.70 for the subjects without such relatives. For the children, the mean number of teeth lost was 0.65 and 0.26, respectively.
- The 95% confidence intervals of the results of the parents did not overlap, meaning that having a close relative with a history of periodontitis is an important prognostic predictor for periodontal treatment outcomes. This was not the case for the children.

Regression results:

- The regression coefficient, indicating whether tooth loss is more prevalent when having a relative with a history of periodontal

disease, was positive and significant for both the parent and the child generations. However, it was lower for the children (0.62) than for the parents (1.02). Patients in the parent generation with a close relative with a history of periodontitis lost on average about one tooth more than patients without such relatives.

Intra-familial comparisons:

- The combination mother-daughter was the most frequent.
- There were no matches in medical history or medication between the groups.
- Children from smoking parents smoked more often than children from non-smoking parents.
- 34% of the families had at least one similar type of tooth missing at intake.
- Almost all children of well-maintained parents were also well-maintained.

Limitations

- There might be a variation between the groups in terms of systemic diseases.
- Family periodontal history for parents in the control group was not based on clinical parameters.
- No genetic tests were performed.
- Follow-up was limited to five years.
- Retrospective study methodology.
- The results of this study might not be extrapolatable to a non-North European ethnic population.
- The transmission of periodontal therapy outcomes might not be directly assessed through the different generations, as the parent and child groups were not directly comparable.

Conclusions & impact

- Both the parent and child groups of patients with a family history of periodontal disease showed approximately three times more tooth loss compared to their control groups.
- A high proportion of the patients were mothers and daughters, but it is unclear whether this is because of greater compliance in female patients or a higher susceptibility of women to periodontal disease.
- Within the limitations of this study, it can be concluded that a family history of periodontitis is a strong prognostic treatment factor.
- The matching strategy used in this study can be a useful model for future association studies.
- In private practice, when treating patients with periodontitis, it is important to enquire if any family member has or has had periodontitis. This important prognostic factor should be taken into consideration when planning the treatment.



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