Evidence Supports the Impact of Smoking Cessation Protocols in Periodontal Therapy

SUMMARY

Selection Criteria
The databases MEDLINE, EMBASE, and CENTRAL were searched without language restriction up to and including August 2012 by two authors. Moreover, a database listing unpublished studies (www.opengrey.eu) and reference lists of any potential studies were analyzed to search for additional studies. Prospective cohort studies of at least 6 months’ duration were included if the participants met the inclusion criteria: (1) smokers with interest in quitting the habit; (2) a diagnosis of periodontitis; and (3) sufficient data on the periodontal treatment and the tobacco use cessation aspects. A total of 2455 articles were identified, of which 2453 were excluded after title and/or abstract screening. Finally, two publications were included in the review: one conducted in the United Kingdom (Preshaw et al., 2005) and one in Brazil (Rosa et al., 2011).

Key Study Factor
To achieve better statistical power, a form of multicenter analysis using an individual patient data (IDP) meta-analysis was applied to examine the effect of smoking cessation on clinical disease-oriented outcomes, i.e., probing depth (PD), clinical attachment level (CAL), and bleeding on probing (BOP) changes.

Main Outcome Measure
Primary outcome measures were CAL and PD. Secondary outcome measures were plaque score, BOP, radiographic changes of the alveolar bone level and number of teeth lost during the period of the study.

Main Results
The two studies included were judged to have high methodological quality. However, they reported a high dropout rate and may have lacked power to detect clinically significant benefits of smoking cessation within the spectrum of clinical parameters routinely used assessing response to treatment in clinical practice.

For the fixed effects IDP meta-analysis the data of 78 patients treated for chronic periodontitis and followed for a 12-month period were available. A highly significant benefit of smoking cessation on the number of sites exhibiting PD reductions ≥2 mm was found with an incident rate ratio [IRR] of 1.30 (95% CI: 1.17-1.44; Poisson absolute value IZI = 4.93; p < 0.001). Quitters demonstrated 30% more sites with PD reductions ≥2 mm than non-quitters. In addition, the frequency of sites with residual PD ≥4 mm at 12 months after treatment was reduced by 22% in quitters compared to non-quitters with an IRR of 0.78 (95% CI: 0.72-0.84; Poisson absolute value IZI = 6.21; p < 0.001). With respect to mean PD reductions, there was a trend toward greater PD reductions in those who quit smoking, with an amount of about 0.2 mm (p = 0.098). When considering CAL and the reduction in percentage of sites with BOP, the differences between quitters and non-quitters were not statistically significant (p = 0.306 and p = 0.173, respectively).
Conclusions

The authors draw careful conclusions from their analysis. They state that smoking cessation seems to promote additional benefits in terms of PD reduction, and smoking cessation seems to be an important component of periodontal therapy. According to the authors, the limited base of evidence from prospective clinical trials on periodontal therapy using smoking cessation protocols highlights the need for more research in this field.

COMMENTARY AND ANALYSIS

Cigarette smoking, active and passive, has been established as a strong environmental risk factor for a large variety of systemic diseases with major public health relevance and also is a major risk factor for chronic periodontitis. Risk factors are generally classified as modifiable and non-modifiable. While gender, age, and ethnicity are non-modifiable, insufficient plaque control or cigarette smoking are identified as modifiable risk factors for periodontal disease. These factors are suitable for therapeutic intervention in the dental setting and could be controlled to prevent the development and progression of the disease. In addition to the negative effects of smoking on the incidence and prevalence of chronic periodontitis, there is strong and sufficient evidence supporting the notion that smoking cessation is beneficial in terms of reducing incidence and progression of periodontitis. Robust evidence from various studies demonstrates that periodontal parameters from ex-smokers are intermediate between those from never smokers and current smokers in terms of periodontitis prevalence, disease progression, response to periodontal therapy, and even tooth loss. In contrast, some authors feel there is a lack of direct evidence from interventional studies for the benefits of cessation in terms of improving periodontal outcomes. Randomized controlled trials (RCT) are often required to show the effectiveness of a treatment. However, to conduct an RCT on the effectiveness of smoking cessation on periodontitis treatment or other oral health outcomes would become very difficult, if not impossible for ethical reasons. An observational study is a suitable design to analyze clinical aspects in the context of smoking. Therefore the authors of the review decided to include longitudinal prospective cohort studies. With respect to the sample size, the two studies included may be considered as underpowered. However, sample size is a major problem in many studies in periodontology. For this review, an interesting approach using an IPD meta-analysis was applied. The statistical method is well known from other medical fields, in particular, those with major public health concern. Up to now, the approach has rarely been applied in periodontal research. The major advantages of meta-analysis of IPD are: (1) it increases the sample size and doing so (2) it increases the statistical power, (3) it provides consistent analysis across studies, (4) it allows for consideration of covariates to examine differences in treatment effectiveness across patients and trials, and (5) it opens the possibility of using advanced modeling methods. The possibility of unavailability of an IPD and the time and costs of an IPD meta-analysis need to be considered as important drawbacks.

The number of cigarettes a patient currently smokes, the intensity and duration of smoking, and/or the time since cessation all influence the detrimental impact of tobacco. Dietrich & Hoffmann (2004) estimated the smoking effect's half-life on chronic periodontitis over the course of 1.5 years using the Comprehensive Smoking Index (CSI). Recently, a time of 10 to 20 years was suggested as the period of time for risk of oral disease to return to that of a non-smoker after heavy tobacco use exposure. This points out two important issues: (1) it is expedient to identify and to categorize former smokers as a separate category and (2) the duration of follow-up in studies/reviews on therapy outcomes after smoking cessation is relevant. The two cohort studies included in the systematic review have a follow-up of 12 months. Considering the time of up to 20 years suggested for return to health of the periodontal tissues after smoking cessation, 12 months appears to be a very short interval. There are good reasons to assume the difference between quitters and non-quitters will increase over time or with respect to the time point of cessation.

In conclusion, evidence from two clinical studies with consistent findings demonstrated an oral health benefit resulting from smoking cessation conducted as part of non-surgical periodontal therapy. The evidence gained from this IPD meta-analysis increases the statistical power by combining the data of both studies in a "virtual multicenter trial." The number of "closed pockets" after periodontal therapy is a very important parameter for the effectiveness, since further treatment is required for many pockets measuring more than 4 mm. A statistically significant and clinically relevant benefit was shown for those who quit smoking in conjunction with non-surgical periodontal therapy.

The periodontal setting is very appropriate for providing smoking cessation due to the regularly scheduled supportive periodontal treatment. Smoking cessation interventions in a dental setting are effective. Aside from the robust evidence for the benefits of smoking cessation in the prevention and therapy of several systemic diseases, there is sufficient evidence for the benefits of smoking cessation for periodontal treatment outcomes.

Therefore there is a convincing argument to implement smoking cessation in the dental setting.

REFERENCES


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