Evidence of an association between diabetes and severity of periodontal diseases

Does diabetes mellitus affect the extent and severity of periodontal diseases?

Khader YS, Dauod AS, El-Qaderi SS, Alkafajei A, Batayha WQ. *Periodontal status of diabetics compared with nondiabetics: a meta-analysis. J Diabetes Complications 2006; 20:59–68*

Data sources The Medline database was searched for studies published from January 1970 to October 2003, with a search by hand for further references in relevant studies.

Study selection Observational studies or clinical trials conducted on humans and published in the English language were included.

Data extraction and synthesis Data extraction was carried out by three authors. Areas of disagreement were solved by discussion. A range of indices were recorded, eg, plaque index (PI), calculus index, gingival index (GI), bleeding on probing (BOP), probing pocket depth (PPD), clinical attachment loss (CAL), gingival recession, periodontal index and bone loss index. Control of diabetes was measured by percentage of glycosylated haemoglobin in the blood. Estimates of the overall difference in each of the periodontal parameters and their corresponding 95% confidence intervals were calculated using both fixed-effect and random-effect models. Homogeneity of effect size was tested using Q statistics. Publication bias was examined by plotting the differences from individual studies against their corresponding standard errors.

Results Eighteen comparative cross-sectional studies, three prospective cohort studies and baseline data from two clinical trials were included. Diabetics had significantly worse oral hygiene as measured by the mean PI, greater severity of gingival disease according to mean GI, and more severe periodontal disease as measured by the mean PPD and CAL. Individuals with diabetes were similar, nevertheless, to nondiabetics in the extent of oral hygiene and gingival and periodontal disease, according to the proportion of surfaces or sites with specified scores for PI, GI, BOP, PPD and CAL.

Conclusions Diabetic patients had worse oral hygiene and higher severity of gingival and periodontal diseases, but they have the same extent of the periodontal diseases as nondiabetics.

Commentary

There has been considerable research over the last 4 decades into the potential interrelationships between periodontal diseases and systemic diseases, in particular diabetes mellitus.¹ Inflammatory processes have been implicated in the pathogenesis of type 2 diabetes and a recently published meta-analysis addressed the question of whether undertaking periodontal treatment might be of benefit in improving glycaemia control in diabetic patients.² This meta-analysis by Khader and colleagues approached the issue from the other direction, ie, whether diabetes has an effect on the extent and severity of periodontal diseases.

The meta-analysis does not appear to have been undertaken as part of a formal systematic review and was not reported according to the Meta-analysis of Observational Studies in Epidemiology guidelines.³ The inclusion criteria were based primarily on the availability of outcomes of interest, using any periodontal parameters, and included both study participants with type 1 and type 2 diabetes. The search strategy was based on periodontal disease and diabetes medical subject headings using only the Medline database and was restricted to English language publications. An additional manual search was performed for references cited in those articles obtained. The number of full text articles retrieved and screened is not reported. The number of excluded articles and the reasons for exclusion are not reported. No quality assessment of included articles is reported.

A total of 21 observational studies (18 cross-sectional) and two clinical trials were included in the meta-analyses. Studies were pooled irrespective of differences in study design. Although the statistical methods used were carefully documented and justified, it must be remembered that any analysis is dependent on the quality of the underlying data. Khader et al. do not provide the reader with sufficient information to assess the comprehensiveness or quality of the data they have combined.

The authors stated aim was to quantify the effect of diabetes mellitus on the extent and severity of periodontal disease but it is not possible to establish causal associations or directionality of events from cross-sectional data. The uncritical pooling of data in this meta-analysis provides further evidence of an association between diabetes and severity of periodontal diseases, but should not be used to infer a cause–effect relationship.

Practice point

This review provides some evidence to support an association between diabetes and severity of periodontal diseases but should not be used to infer a cause–effect relationship.

David R Moles

International Centre for Evidence Based Oral Health, Eastman Dental Institute, University College London, London, UK

1. Southerland JH, Taylor GW, Moss K, Beck JD, Offenbacher S. Commonality in chronic inflammatory diseases: periodontitis, diabetes, and coronary artery disease. *Periodontology* 2000 2006; 40:130–143.
2. Janket S-K, Wightman A, Baird AE, Van Dyke TE, Jones JA. Does periodontal treatment improve glycemic control in diabetic patients? A meta-analysis of intervention studies. *J Dent Res* 2005; 84:1154–1159.
3. Stroup DF, Berlin JA, Morton SC, Olkin I, Williamson DG, Rennie D, et al. Meta-analysis of observational studies in epidemiology. *J Am Med Assoc* 2000; 283:2008–2012.

Evidence-Based Dentistry (2006) 7,45. doi:10.1038/sj.ebd.6400409

Address for correspondence: Dr YS Khader, Department of Community Medicine, Public Health and Family Medicine, Faculty of Medicine, Jordan University of Science and Technology, PO Box 121, Irbid 22110, Jordan. E-mail: yousef.k@excite.com.