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Diabetes and Oral Implant Failure: A Systematic Review

APPENDIX

MATERIALS & METHODS

Objective

The purpose of the present review was to test the null hypothesis of no difference in implant failure rates, postoperative infection, and marginal bone loss for diabetic or nondiabetic patients being rehabilitated by dental implants, against the alternative hypothesis of a difference.

Search Strategies

An electronic search without time or language restrictions was undertaken in March 2014 in the following databases: PubMed, Web of Science, and the Cochrane Oral Health Group Trials Register. The following terms were used in the search strategy on PubMed:

{Subject AND Adjective}

{*Subject:* (dental implant failure OR dental implant survival OR dental implant success [text words])}

AND

Adjective: (diabetes OR diabetic [text words])}

The following terms were used in the search strategy on Web of Science, refined by selecting the term “dentistry oral surgery medicine” in the filter “research area”:

{Subject AND Adjective}

{*Subject:* (dental implant failure OR dental implant survival OR dental implant success [title])}

AND

Adjective: (diabetes OR diabetic [title])}

The following terms were used in the search strategy on the Cochrane Oral Health Group Trials Register:

(dental implant OR dental implant failure OR dental implant survival OR dental implant success AND (diabetes OR diabetic))

A manual search of dental implants–related journals was also performed—including *British Journal of Oral and Maxillofacial Surgery*, *Clinical Implant Dentistry and Related Research*, *Clinical Oral Implants Research*, *European Journal of Oral Implantology*, *Implant Dentistry*, *International Journal of Oral and Maxillofacial Implants*, *International Journal of Oral and Maxillofacial Surgery*, *International Journal of Periodontics and Restorative Dentistry*, *International Journal of Prosthodontics*, *Journal of Clinical Periodontology*, *Journal of Dental Research*, *Journal of Oral Implantology*, *Journal of Craniofacial Surgery*, *Journal of Cranio-maxillofacial Surgery*, *Journal of Dental Research*, *Journal of Maxillofacial and Oral Surgery*, *Journal of Oral and Maxillofacial Surgery*, *Journal of Oral Rehabilitation*, *Journal of Periodontology*, and *Oral Surgery Oral Medicine Oral Pathology Oral Radiology and Endodontology*.

The reference list of the identified studies and the relevant reviews on the subject were also scanned for possible additional studies. Moreover, online databases providing information about clinical trials in progress were checked (<http://clinicaltrials.gov>; <http://www.centerwatch.com/clinicaltrials>; <http://www.clinicalconnection.com>).

Inclusion and Exclusion Criteria

Eligibility criteria included clinical human studies comparing implant failure rates in diabetic and nondiabetic patients. For the studies publishing more than 1 article but with different follow-up periods, only the publication with the longest (the last) follow-up period was considered, as long as the sample size remained the same. For this review, implant failure represents the complete loss of the implant. Exclusion criteria were case reports, technical reports, animal studies, *in vitro* studies, and review papers.

Study Selection

The titles and abstracts of all reports identified through the electronic searches were read independently by the 3 authors. For

studies appearing to meet the inclusion criteria or for which there were insufficient data in the title and abstract to make a clear decision, the full report was obtained. Disagreements were resolved by discussion among the authors.

Quality Assessment

The quality assessment was performed by using the recommended approach for assessing risk of bias in studies included in Cochrane reviews (Higgins and Green, 2011). The classification of the risk of bias potential for each study was based on the following 4 criteria: sequence generation (random selection in the population), allocation concealment (steps must be taken to secure strict implementation of the schedule of random assignments by preventing foreknowledge of the forthcoming allocations), incomplete outcome data (clear explanation of withdrawals and exclusions), and blinding (measures to blind study participants and personnel from knowledge of which intervention participants received). The incomplete outcome data criterion is also considered addressed when there are no withdrawals and/or exclusions. A study that met all the criteria mentioned above was classified as having a low risk of bias; a study that did not meet 1 of these criteria was classified as having a moderate risk of bias. When 2 or more criteria were not met, the study was considered to have a high risk of bias.

RESULTS

Literature Search

The study selection process is summarized in Figure 1. The search strategy resulted in 1,144 entries. The 3 reviewers independently screened the abstracts for those articles related to the focus question. The initial screening of titles and abstracts resulted in 57 full-text papers; 25 were cited in more than one research of terms. The full text of the remaining 32 articles led to the exclusion of 22 because they did not meet the inclusion criteria: 11 were review articles; 8 did not indicate the number of implants and/or failures in each group; 1 did not evaluate implant failure; 1 was an earlier follow-up of another published article; and 1 was performed in animals. Additional hand-searching of the reference lists of selected studies yielded 3 additional articles and 1 thesis. Thus, a total of 14 publications were included in the review.

REFERENCE

Higgins JP, Green S, editors (2011). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1.0. The Cochrane Collaboration. URL accessed on 5/15/2014 at: www.cochrane-handbook.org.