Tooth preservation or implant placement: a systematic review of long-term tooth and implant survival rates

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CRD summary
The review concluded that implant survival rates did not exceed those of compromised but adequately treated and maintained teeth. The authors' conclusions were based on heterogeneous observational studies, none of which compared survival rates of teeth with dental implants. Therefore, these conclusions may not be reliable.

Authors' objectives
To assess the long-term survival rates and treatment outcomes for retained compromised teeth in comparison with the long-term survival rates for dental implants.

Searching
MEDLINE was searched from inception to 2013 for studies published in English. Bibliographies of relevant studies were examined. Search terms were not reported.

Study selection
Studies that assessed the long-term effectiveness of dental implants or that of tooth preservation were eligible for inclusion. Studies had to have a minimum follow-up of 15 years. Studies had to include at least five cases and report on survival rates of teeth and implants.

Almost all the patients received supportive periodontal treatment in studies that focused on tooth loss. Type of implants and the system of implantation varied. Patients' age ranged from eight to 77 years in tooth preservation studies and 15 to 87 years in implant studies.

More than one reviewer was involved in the study selection; disagreements were resolved through discussion.

Assessment of study quality
Studies were assessed for risk of bias, based on randomisation, blinding, loss to follow-up, use of intention-to-treat analysis, whether or not trials stopped early and whether studies received external funding.

The authors did not state how many reviewers were involved in the quality assessment.

Data extraction
Patient characteristics, implant system, type of prostheses were extracted along with tooth/implant survival rate.

The authors did not report how many reviewers were involved in data extraction.

Methods of synthesis
Data were presented as a narrative synthesis due to heterogeneity.

Results of the review
Nineteen studies were included in the review (nine tooth preservation and 10 implant). Follow-up ranged from 16 to 30 years in the tooth preservation studies and 15 to 23 years in the implant studies. According to the authors, appropriate randomisation was used in all included studies even though most appeared to be non-randomised observational studies. Blinding and loss to follow-up were not reported for tooth preservation studies. The authors stated that all studies used intention-to-treat analysis and most studies did not report whether they received financial support from the dental implant industry.

The overall long-term rate of implant loss ranged from zero to 33.6% and tooth loss ranged from 3.6% to 13.4%. Cumulative implant survival rate ranged between 69.6% and 100%. Periodontitis was the main cause of tooth loss in most studies. Various factors affecting implant survival rates were reported in the review.
Authors' conclusions
Implant survival rates did not exceed those of compromised but adequately treated and maintained teeth.

CRD commentary
The review question and inclusion criteria were clear. Only one database was searched and which together with the restriction to studies in English means there was potential for language and publication biases. Appropriate methods to reduce reviewer error and bias were used for some stages of the study selection process but it was unclear whether similar methods were used for quality assessment and data extraction. Most included studies were observational in nature, so the criteria used to assess risk of bias appeared to be both inappropriate and applied incorrectly. A narrative synthesis was appropriate in view of the diverse studies.

The authors conclusions are based on heterogeneous observational studies published over a 34-year period, none of which compared survival rates of teeth with dental implants. Therefore these conclusions may not be reliable.

Implications of the review for practice and research
Practice: The authors stated that the decision to extract a tooth and place a dental implant should be made cautiously. Implant treatment may also require additional surgical procedures that might pose some risks. A tooth can be extracted and replaced at any time; however, extraction is a definitive and irreversible treatment.

Research: The authors did not state any implications for research.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.