A systematic review of biologic and technical complications with fixed implant rehabilitations for edentulous patients

Papaspyridakos P, Chen CJ, Chuang SK, Weber HP, Gallucci GO

CRD summary
This review concluded that implant-supported fixed complete dental prostheses were associated with a continuous rate of biologic and technical complications. The review included mostly non-randomised studies of uncertain quality and the conclusions may not be reliable.

Authors' objectives
To assess the incidence and types of biological and technical complications associated with implant-supported fixed complete dental prostheses.

Searching
PubMed was searched for studies published in English between 1980 and February 2010. References of selected articles were checked.

Study selection
Randomised controlled trials (RCTs) and prospective cohort studies that assessed complete-arch fixed implant rehabilitations in edentulous patients were eligible for inclusion. Only studies that assessed solid screw-type implants were considered. Studies had to include at least 10 patients and use the prosthesis insertion as baseline. A minimum follow-up of five years was required.

All of the included studies assessed screw-retained metal-resin prostheses; one also used metal-ceramic prostheses. Five studies used the Branemark implant system; the other two used the Straumann system. Maxilla and mandible arches were represented.

Two reviewers independently selected the studies for inclusion in the review.

Assessment of study quality
The authors did not state that they assessed the validity of the included studies.

Data extraction
Data were extracted on implant- and prosthesis-related biological and technical complications after five- and 10-year follow-up. Event rates per year of exposure and their 95% confidence intervals were calculated. Authors were contacted for more detail where necessary.

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

Methods of synthesis
Pooled event rates together with 95% confidence intervals were calculated using a random-effects meta-analysis. Heterogeneity was assessed using goodness-of-fit statistics and the I² statistic.

Results of the review
Seven studies (278 patients, 1,596 implants) were included in the review. Only one of these was an RCT (23 patients, 139 implants). Most studies had five-year follow-up; three studies reported durations of 10 to 23 years. Mean prosthesis exposure time was 9.5 years.

The overall complication rate was 24.6% (95% CI 22.7% to 27.5%) per 100 years. After five years 29.3% of prostheses (95% CI 26.5% to 32.2%) were complication free. After 10 years only 8.6% (95% CI 7.1% to 10.3%) were still complication free.

The most common biologic complication was peri-implant bone loss greater than 2mm with about 4% of cases for
every year exposed. The most common technical complication was screw fracture with an annual complication rate of 2.1%.

Details of individual complication rates were provided in the paper.

**Authors’ conclusions**

Biologic and technical complications occur continuously over time as a result of fatigue and stress. Even when they do not lead to implant or prosthesis failures they have a significant time and cost impact on clinicians and patients.

**CRD commentary**

The review had a clear question supported by specific inclusion criteria. The search was limited to a single database and inclusion was restricted to studies published in English; these factors may have increased the chances that relevant studies were omitted from the review. The authors reported using methods designed to reduce reviewer bias and error during study selection but not during data extraction. There was no assessment of the reliability of the included studies and no information about control groups in the studies. It was unclear whether the analysis was conducted on a per patient/or per implant basis or how it was weighted. The summary estimates did appear to represent the data from the included studies. Most of the studies appeared to be small uncontrolled series of patients. Very substantial differences between the results of the studies were not explored. In the absence of information on the reliability of the included studies the conclusions of the review may not be reliable.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated a need for longitudinal studies of implant-supported fixed complete dental prostheses that report on complications and adverse clinical outcomes.

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