A systematic review of the performance of ceramic and metal implant abutments supporting fixed implant reconstructions

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CRD summary
This review aimed to assess the five-year survival rates and incidences of complications associated with ceramic abutments relative to metal abutments and concluded that there were no significant differences in performance between the two types. These conclusions were reasonable, but were not based on a direct comparison.

Authors' objectives
To assess the five-year survival rates and incidences of complications associated with ceramic abutments relative to metal abutments. A review of laboratory studies was carried out but is not reported in this abstract.

Searching
MEDLINE and The Cochrane Library were searched from 1990 to 2008 for English- and German-language publications. Search terms were reported. References of retrieved articles and previous systematic reviews were examined to identify further relevant studies. Two German-language dental journals were handsearched for the years 2004 to 2008.

Study selection
Studies were eligible for inclusion in the review if they were randomised controlled trials (RCTs), prospective or retrospective cohort studies with at least three year's mean follow-up that reported details of implant abutments in partially dentate patients who received implant-supported single crowns and/or fixed dental prostheses. Studies in which patients were not examined clinically at follow-up were excluded.

Three reviewers independently selected studies for inclusion in the review. Any disagreements were resolved by discussion.

Most studies were conducted in an institutional setting (such as universities and specialised clinics). Most studies included patients between the ages of 14 and 88 years. Mean length of follow-up among included studies ranged from three to 10 years. Types of construction included fixed dental prostheses, fixed partial dentures and single crowns.

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

Data extraction
Data were extracted on failure and complication rates of abutments/reconstructions. These were calculated by dividing the number of events (failures or complications) by the total abutment exposure time. Total exposure time was estimated if not reported.

Three reviewers independently extracted data. Disagreements were resolved by consensus.

Methods of synthesis
Poisson regression was used to estimate the failure and complication rates per 100 abutment years. Spearman goodness-of-fit statistics were calculated to determine heterogeneity of study-specific event rates. In the presence of statistical heterogeneity, a random-effects Poisson regression model was used. Five-year cumulative event and survival rates with 95% confidence intervals (CIs) were calculated.

Results of the review
A total of 29 studies of 5,849 abutments (166 ceramic and 5,683 metal) in more than 2,203 patients were included in
The estimated five-year survival rate was 99.1% (95% CI 93.8 to 99.9) for ceramic abutments and 97.4% (95% CI 96.0 to 98.3) for metal abutments.

The estimated five-year incidence of technical complications was 6.9% (95% CI 3.5 to 13.4) for ceramic abutments and 15.9% (95% CI 11.6 to 21.5) for metal abutments.

The estimated five-year incidence of biological complications was 5.2% (95% CI 0.4 to 52.0) for ceramic abutments and 7.7% (95% CI 4.7 to 12.5) for metal abutments.

**Authors' conclusions**

Five-year survival rates appeared to be similar for ceramic and metal abutments. The identified studies did not provide evidence for differences in technical or biological outcomes of ceramic and metal abutments.

**CRD commentary**

The review question was partially defined in terms of participants, interventions and study designs of interest. Attempts were made to minimise bias in selection and extraction of data from included studies. Multiple sources were searched to identify relevant evidence, although the restriction to English- and German-language studies could have led to language bias. No attempt was made to differentiate studies in terms of quality. Outcomes for some measures (such as technical complications) appeared somewhat heterogeneous. The authors main conclusions followed from the evidence presented, but it should be noted that ceramic and metal abutments were not compared directly with each other.

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

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

**Research:** The authors stated that more studies with longer follow-up of ceramic abutments were needed to allow further comparison with metal abutments and they recommended standardised methods of analysis of abutment strength.

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