Clinical studies of fiber-reinforced resin-bonded fixed partial dentures: a systematic review

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CRD summary
The authors concluded that estimated survival rates of fibre-reinforced composite fixed partial dentures at two years showed substantial heterogeneity and that it was not possible to explore reasons for this. In view of the limited search and the reported methodological limitations of the included observational studies it is difficult to judge the reliability of the authors’ conclusions.

Authors' objectives
To evaluate survival rates for fibre-reinforced composite fixed partial dentures and explore the effect of risk factors on survival rates.

Searching
MEDLINE was searched for studies published in English between 1950 and October 2007. Search terms were reported. Reference lists of selected papers were handsearched.

Study selection
Prospective and retrospective cohort studies that evaluated fibre-reinforced composite fixed partial dentures were eligible for inclusion. Descriptive studies, case reports and reviews, and in vitro studies were excluded. The review assessed fixed partial denture survival (defined as fixed partial dentures remaining in situ with or without modification during follow-up), technical complications and failures (defined as replaced or re-bonded fixed partial dentures).

The included studies evaluated fixed partial dentures with different types of framework design. Just under half of the fixed partial dentures were inlay-retained; others included surface-retained fixed partial dentures, complete coverage crown as retainer and hybrid retainer types. Studies differed in their use of abutment teeth and materials. Most studies evaluated indirect or laboratory manufactured fixed partial dentures and most were conducted in institutions such as university clinics. Where reported, patients’ age ranged from 15 to 75 years. The duration of maximal follow-up ranged from 0.9 to 5.7 years.

Two reviewers independently selected studies and resolved disagreements by discussion.

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

Data extraction
Where possible, survival rates and complications for each fixed partial denture design were extracted and entered into a standardised table. Individual fixed partial dentures from each study were treated as individual cases. Data were obtained from tables, figures and text.

It was not clear how may reviewers extracted data.

Methods of synthesis
For all fixed partial dentures, time of failure was categorised into six-month intervals and fixed partial denture survival was assessed using the Kaplan-Meier method. For 12 data sets, survival rates at two years follow-up were presented in a forest plot and heterogeneity was assessed. There were insufficient data to carry out the planned regression analysis to examine the influence of fixed partial denture type or location on survival rates.

Results of the review
Fifteen studies provided 13 sets of fixed partial dentures data for analysis (n=435 dentures). One of the studies was a controlled study that compared full ceramic fixed partial dentures with fibre-reinforced composite fixed partial dentures...
dentures; the others were observational studies. Where reported, sample size ranged from 12 to 39 patients.

Methodological limitations included lack of reporting of study characteristics such as selection criteria for patients, lack of reporting of failure rates, reporting of failure rates but not with respect to fixed partial denture design and location and different definitions of treatment success. Where reported, drop-out rates ranged from 0% to 22%.

**Overall survival**: Survival rates over all 13 data sets ranged from 50% to 100%. The calculated survival rate at 4.5 years was 73.4% (69.4% to 77.4%; it appeared that the range represented a 95% confidence interval but this was not explicitly stated); this was based on 11 studies with 399 fixed partial dentures that provided data for a survival curve up to five years follow-up.

**Failure rates**: 88 of 435 fixed partial dentures failed within five years. The forest plots of mean survival rates at two years follow-up across 12 data sets showed heterogeneity. The most common technical problems were fracture or delamination of the veneering composite (reported in 10 studies). Other problems included occlusal wear (reported in nine studies), debonding of one retainer (five studies), discolouration and fracture lines (three studies).

**Authors' conclusions**

Overall survival rates of fibre-reinforced composite fixed partial dentures at 4.5 years follow-up was 73.4%. However, converted survival rates of fibre-reinforced composite fixed partial dentures at two years showed substantial heterogeneity. It was not possible to explore the influence of risk factors using regression analysis. The most common technical problems reported were fracture of the fixed partial denture and delamination of the veneering composite.

**CRD commentary**

The review aim was stated. Inclusion criteria were defined for intervention and appropriately broadly defined for study design. Review outcomes were specified, but did not form part of the inclusion criteria. Limiting the search to English-language studies identified in one database plus references may have resulted in the omission of other relevant studies and raised the potential for publication and language biases. Appropriate methods were used to minimise reviewer error and bias during study selection, but it was unclear whether similar methods were used for data extraction. Study validity was not formally assessed, but the authors discussed some limitations of the included studies. Survival rates were pooled despite considerable variation between studies; the authors acknowledged heterogeneity among studies, but there were insufficient data to examine potential sources of heterogeneity. The discussion highlighted some limitations of evidence from the diverse observational studies. In view of the limited search, lack of formal assessment of study quality and reported methodological limitations of the included small and diverse observational studies it is difficult to judge the reliability of the authors' conclusions.

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

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

**Research**: The authors stated that well-designed randomised controlled trials were required to evaluate fibre-reinforced composite fixed partial dentures.

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Record Status
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