

Summary of: A review of the success and failure characteristics of resin-bonded bridges

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VERIFIABLE CPD PAPER

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Objectives This literature review was designed to assess and compare the success rates and modes of failure of metal-framed, fibre-reinforced composite and all-ceramic, resin-bonded bridges. **Materials and method** A Medline search (Ovid), supplemented by hand searching, was conducted to identify prospective and retrospective cohort studies on different resin-bonded bridges within the last 16 years. A total of 49 studies met the pre-set inclusion criteria. Success rates of 25 studies on metal-framed, 17 studies on fibre-reinforced composite and 7 studies on all-ceramic, resin-bonded bridges were analysed and characteristics of failures were identified. **Results** The analysis of the studies indicated an estimation of annual failure rates per year to be 4.6% ($\pm 1.3\%$, 95% CI) for metal-framed, 4.1% ($\pm 2.1\%$, 95% CI) for fibre-reinforced and 11.7% ($\pm 1.8\%$, 95% CI) for all-ceramic, resin-bonded bridges. The most frequent complications were: debonding for metal-framed, resin-bonded bridges (93% of all failures); delamination of the composite veneering material for the fibre-reinforced bridges (41%) and fracture of the framework for the all-ceramic bridges (57%). **Conclusions** All types of resin-bonded bridges provide an effective short- to medium-term option, with all-ceramic performing least well and having the least favourable mode of failure. The methods of failures were different for different bridges with metal frameworks performing the best over time.

EDITOR'S SUMMARY

For many years the creation of a traditional fixed bridge has been, and arguably remains, at the pinnacle of a dentist's clinical skills as well as utilising the technician's technical expertise. A complex construction which is a cross between micro-engineering and jewellery but with a functional and aesthetic imperative, the bridge has been the epitome of paralleled perfection; the ideal combination of the art and science of dentistry. With the introduction of acid-etching, resin-retained restorations and then resin-bonded bridges a new chapter opened up in bridge construction. The most notable distinction is the reduced or negated need for the removal of sound tooth tissue in preparation of the abutment teeth.

Whether the arrival of the reliable implant with the advent of osseointegration has usurped that key position and returned the top accolade to the surgeon is a matter of personal opinion.

There is no question, however, that the implant provides a viable alternative to the bridge, and one which must at the very least be considered in virtually all situations where a missing tooth needs to be replaced.

This literature review on the longevity of resin-bonded bridges shows that all types provide an effective short- to medium-term option, with all-ceramic performing least well and having the least favourable mode of failure. The overall success of this restorative solution should help to reassure practitioners when discussing treatment options with patients in relation to predictability.

What would be of further interest would be to know the numbers of traditional bridges and resin-bonded bridges provided in recent years and how these compare to the rise in the number of implants placed. Additionally, it would be of value to know what patients' reactions are to the choice between resin-bonded bridges and implants and how

the surgical, financial and long term considerations impact on their choices and decisions. Perhaps a project for the authors to take forward now that this literature review is complete?

The full paper can be accessed from the *BDJ* website (www.bdj.co.uk), under 'Research' in the table of contents for Volume 215 issue 2.

Stephen Hancocks
Editor-in-Chief

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IN BRIEF

- Assists dentists in selecting the most suitable type of framework for a resin-bonded bridge.
- Increases dentists' awareness of the commonest modes of failure for resin-bonded bridges.
- Provides advice on how long resin-bonded bridges should last.

COMMENTARY

Resin bonded bridges (RBBs) are a well-documented and established treatment modality. Traditionally these restorations have used metal frameworks, however, the drive for tooth coloured restorations has resulted in the development of resin reinforced and all ceramic alternatives. This article adds to the literature by providing a comparison of the three types of RBB available, highlighting the indications and pros and cons of each.

The majority of studies regarding the success and survival of RBBs are observational cohort studies with varying lengths of follow up, in which factors affecting success are poorly controlled. Following a well-defined review and selection process, the authors of this systematic review have attempted to bring these studies together to calculate three year survival rates for each type of RBB.

For metal framework bridges the calculated survival rate is lower than that previously reported.¹ This is likely to be due to differing study inclusion criteria and definitions of success and survival. For example, Miettinen and Millar have only classed those restorations with no history of debond as successful in contrast to Pjettersson *et al.* who considered a recemented bridge in place at follow up to be a success.

The clinical decision making process with regards to choice of restoration involves more than just a comparison of success rates. As discussed by the authors RBBs have the advantage of being minimally invasive and the

consequences of failure are likely to be less significant than those associated with the failure of fixed alternatives. RBBs are also relatively cheap and the definitive restoration can be delivered quickly, which may appeal to patients reluctant to commit to lengthy courses of treatment.

Although success rates of RBBs may well be lower than those of conventional bridges and implant supported crowns, no treatment modality is reported as being 100% successful. Even the best planned, placed and maintained restorations may need replacement and therefore, the advantages of RBBs in terms of their limited biological and financial cost should not be overlooked.

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1. Pjettersson B E, Tan W C, Tan K, Bragger U, Zwahlen M, Lang N P. A systematic review of the survival and complication rates of resin-bonded bridges after an observation period of at least 5 years. *Clin Oral Implants Res* 2008; **19**: 131-141.

AUTHOR QUESTIONS AND ANSWERS**1. Why did you undertake this research?**

To find out more about the three major types of framework used for resin-bonded bridges: metal, zirconia and glass-fibre.

In particular, we wanted to assess the survival rates of these bridges and to try to determine from published literature the reasons why these three types of bridge fail.

2. What would you like to do next in this area to follow on from this work?

We completed our aims and objectives for this study and no further study is planned.