

Guidelines: Resin-Bonded Bridges (RBB)

WHAT IS AN RBB?

A fixed indirect restoration which replaces a missing tooth. They are retained on an abutment tooth and require minimal or no tooth preparation. When the prescribed techniques are followed, RBBs are predictable and long-term replacements for missing teeth. Their prognosis can rival other fixed options, including implants.

Historically, RBBs were manufactured in metal-ceramic. With the demand for tooth-coloured materials, other options can be considered. These materials, however, have only relatively short-term research.

WHO IS SUITABLE FOR AN RBB?

Potentially any patient with a relatively intact abutment tooth and stable periodontal health.

ISN'T AN IMPLANT-SUPPORTED CROWN THE BEST TOOTH REPLACEMENT?

Sometimes, but this decision is dependent on the patient's circumstances.

WHAT TEETH CAN THEY REPLACE?

All teeth, if they meet the criteria for success.

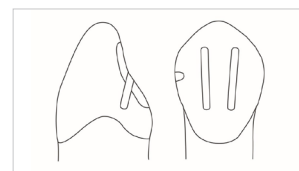
WHAT ARE THE CRITERIA FOR SUCCESS?

- 1** *One abutment, one pontic*
The replacement pontic should be cantilevered from a single abutment tooth. RBBs fail because additional retainers become de-bonded due to the relative movements of the teeth in their periodontal ligaments. A pontic cantilevered from a single abutment avoids this problem. If it de-bonds – it will fall out.
- 2** *Space*
Enough interocclusal space is required to accommodate the retainer. Reducing the incisal edge of the opposing tooth or palatal or lingual surfaces of the abutment should be avoided as this increases the biological cost (damage) to the teeth. It is better to create space with orthodontic movement or a 'Dahl' procedure.
- 3** *Occlusion*
Occlusal contacts on the pontic should only be line in maximum intercuspation (MI) and avoided in all excursive movements. Maintaining a contact in MI prevents overeruption of the opposing tooth, as the force will tend to seat the restoration. Contact on the retainer is OK.
- 4** *Tooth preparation*
Retention of the bridge can be improved with minimal intra-enamel tooth preparation in the form of grooves. Two designs (illustrated here) have been shown to be effective. The grooves should be very precise to ensure resistance to displacement. The burs used are small and sharp. These are difficult to achieve accurately without magnification and illumination.
Carbide burs, such as a 168 or 169 fissure and half-round carbide burs, are good for making precise grooves. They should be new. Unsupported enamel and be removed with diamon burs or chisels.
In patients where the RBB may be considered as a long-term provisional, such as growing children, instead of preparing grooves, accept the higher chance of debonding, as this leaves the abutment intact until a definitive solution is determined.
- 5** *Cementation*
RBBs are, by definition, cemented with resin-composite cements. Most of the long-term research used Kuraray Panavia cements, which were specially formulated for bonding metal alloys. An opaque cement also blocks out the greying of a metal retainer behind the abutment tooth.
Doing this under a rubber dam is recommended, as it controls and helps in cleaning up.

Tooth preparation A: Two vertical proximal grooves, with or without a gingival finishing line



Tooth preparation B: Two (or one if no space) palatal grooves, with a proximal groove



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RBB in situ



'ALL CERAMIC' RBBS

The criteria have been established for metal-ceramics over many years. The technique for all ceramic restorations differs in the choice of material, tooth preparation and cements. The occlusal parameters remain the same.

Materials and preparation

There are essentially two choices; etchable glasses (such as Lithium disilicate), or Zirconia (plus or minus veneered with porcelain). Glasses will provide the most predictable bond to enamel. Zirconia does not bond to enamel predictably, it is however strong. Failure of an RBB manufactured in Zirconia is likely to be a debond, versus a glass which is more likely to fracture. It is your choice which is the most appropriate for your patient.

Logically, there is no advantage in pursuing small grooves to achieve additional resistance to displacement. Due to the manufacturing process, duplication of small groove in a Zirconia retainer cannot be achieved. A glass ceramic would provide excellent retention due to the etch, and therefore grooves are not required.

The potential weakness in these materials, however, needs to be considered. Preparing an abutment tooth to accommodate an adequate connector between the pontic and retainer should be considered. Similarly adequate thickness and therefore more space is required between the opposing teeth for strength is needed. Such preparation may compromise the conservative philosophy of the technique.

Cements

Again, resin composites need to be utilised, but tooth-coloured shades can be used as there is no need to mask the retainer.

FAILURE

If an RBB de-bonds but remains intact, it may be salvageable by cleaning, repairing and recementing the tooth and retainer. Note that if grooves were used, these may increase in size and provide less resistance.

Dr Gordon Burt, Prosthodontist

References

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Botelho MG, Ma X, Cheung GJK, Law RKS, Tai MTC, Lam WYH. Long-term clinical evaluation of 211 two-unit cantilevered resin-bonded fixed partial dentures. *J Dent* 2014; 42:778-784.

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