

**CLINICAL
SECTION**

Twin-block Re-activation

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This paper briefly reviews reasons for re-activating Twin-blocks, discussing different approaches and describing a new, simple, cost effective approach, which can be undertaken at the chairside.

Key words: Twin-block, re-activation, functional appliances

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Introduction

Clark¹ introduced the Twin-block (TB) over 20 years ago and it has achieved widespread use, particularly in the UK, where it is the most popular functional appliance used for Class II correction.² One of the many advantages of the TB is the ability to increase the degree of mandibular advancement by adapting the existing appliance. This re-activation has been recommended for a number of reasons.

Patient comfort

Re-activation of the appliance in a sagittal direction is often required during treatment. Patients may not tolerate the required¹ initial mandibular advancement. In cases with larger overjets, sequential additions to the acrylic biteblocks are usually necessary to achieve the recommended edge-to-edge incisor relationship, whilst maintaining patient comfort and compliance.

Reduction of undesirable dento-alveolar forces and maximizing skeletal change

Mills,³ following a review of the literature, concluded that correction of Class II division 1 malocclusions with functional appliances was achieved primarily through tipping of the teeth. Falck and Frankel,⁴ suggested that sequential advancement using a Frankel appliance resulted in less dento-alveolar effects in the correction of Class II malocclusions. In addition, several authors^{4–6} suggest that regular, incremental advancement is better tolerated by the patient, as it reduces TMJ symptoms and produces improved sagittal growth of the mandible. However, Banks *et al.*⁷ conducted a randomized,

controlled clinical trial on 200 patients aged between 10 and 14 years, investigating the effectiveness of incremental versus maximum bite advancement during TB therapy. They concluded that incremental advancement produced no advantages over initial maximum protrusion. This failure of sequential movement to confer a positive clinical effect has also been confirmed in patients using modified TB appliances.^{8,9}

The best quality current evidence would therefore seem to suggest that incremental re-activation of TB appliances does not produce greater skeletal changes. However, the re-activation of TB appliances may be required in those cases where the patient cannot comfortably achieve maximum protrusion immediately. The aim of this paper is to introduce a quick and reliable way to achieve re-activation at the chairside, without the use of the laboratory.

Methods of re-activation of TBs

Laboratory re-activation

The re-activation of the appliance can be carried out on articulators in the laboratory. Clark¹ recommended laboratory additions of cold-cured acrylic to the mesially-inclined plane of the upper bite blocks. This has the disadvantage of involving 2 clinical appointments for the patient and additional laboratory costs, but with the advantages of a well-trimmed, polished appliance and no residual monomer.

Chairside re-activation

Two methods are currently used.

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Figure 1 Acrylic reactivation tablet attached to upper twin block

Cold-cured acrylic. Cold-cured activation involves the mixing of powdered acrylic with liquid monomer to produce an acrylic paste, which can be added to the inclined planes of the TB. This can be messy, time-consuming, requires polishing and has the added complication of leaching residual monomer. Alternatively, preformed acrylic buttons, in varying dimensions, can be fabricated by the technician and added using the cold-cured acrylic (Figure 1).

Advancement screws. Carmichael *et al.*¹⁰ described a modification to the TB to completely avoid the need to add acrylic. They described the addition of a 12 or 16 mm stainless steel screw into each upper biteblock. The screw head is inserted at a 70° angle to the lower bite block. Re-activation is achieved by the use of advancement spacers. These are discs, 6 mm in diameter, constructed from polyacetal co-polymer resin and available in widths of

1–5 mm. The screws are removed and the discs are slid on against the bite block (Figure 2).

The authors suggest many advantages over the cold-cured acrylic method. These include: asymmetric advancement, accurate measurable advancement, quick adjustment at the chairside and reversibility. However, the modification involves an initial capital outlay. The authors also acknowledge that the screw system does not allow trimming of the biteblocks to allow eruption of posterior teeth in deep bite cases. In these cases, they suggest the use of an initial URA to achieve overbite reduction and expansion followed by a TB.

A new approach to re-activation: chairside addition of light-cured acrylic

In this article, we introduce a system of re-activation of the TB appliance, which is quick, reliable, with minimal cost.

Material. Triad™ Visible Light Cure Custom Tray Material: this is a pre-mixed sheet containing bis-methacrylate and silicon dioxide.

Thickness. Two millimeter thick sheets in pink/translucent.

Bonding agents. VLC bonding agent containing methyl methacrylate.

Cost. Twenty-four sheets cost €97.50, 15 ml of bonding agent €11.20.

Clinical steps

- Establish how much activation of the appliance is needed and whether this needs to be symmetrical.



Figure 2 Twin Block with advancement screw

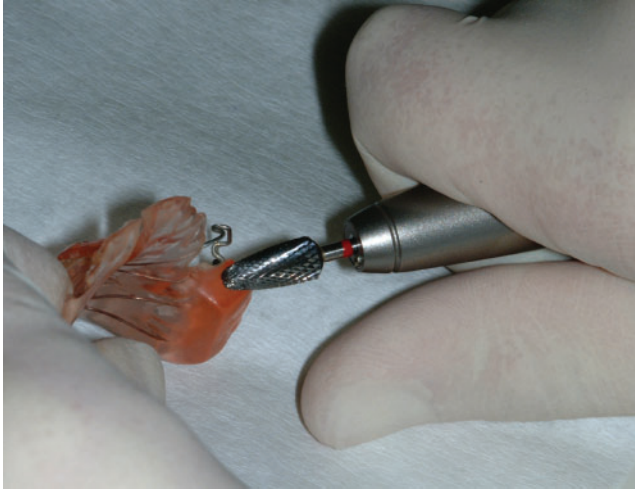


Figure 3 Roughening surface of block

- Encourage the patient to posture to the desired point with both appliances *in situ*.
- Remove the upper TB from the mouth, dry and roughen the mesially inclined planes with an acrylic bur (Figure 3). Paint a thin layer of bonding agent onto the surface (Figure 4).
- Cut an area equivalent to the inclined plane of the TB from the sheet of acrylic (Figure 5). Then, working extra-orally, place on each of the blocks until the required degree of advancement is achieved (Figure 6). An initial set is achieved by shining the curing light for 10 seconds.

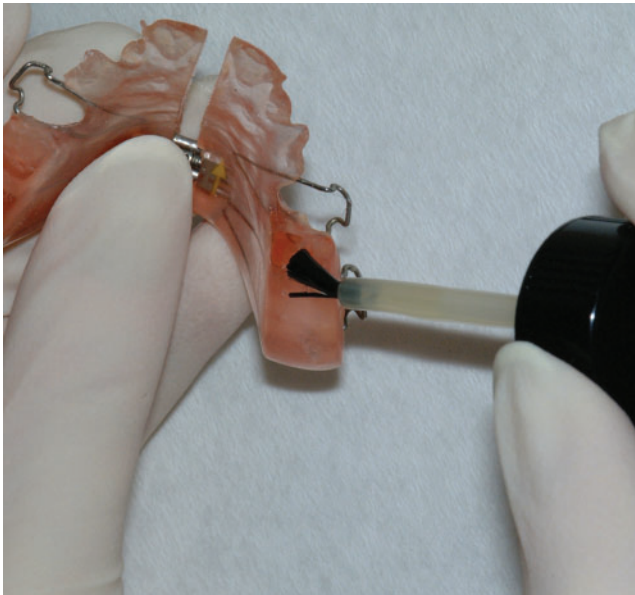


Figure 4 Applying bond to block

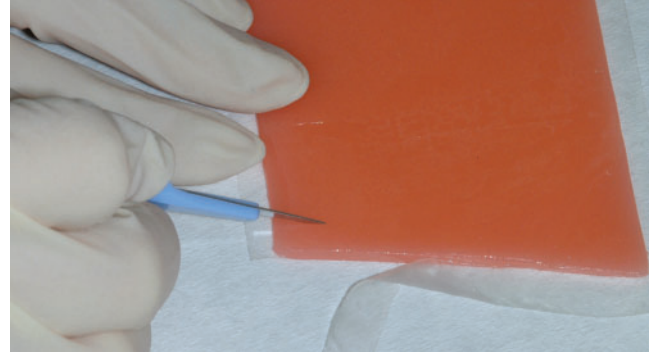


Figure 5 Cutting acrylic to size

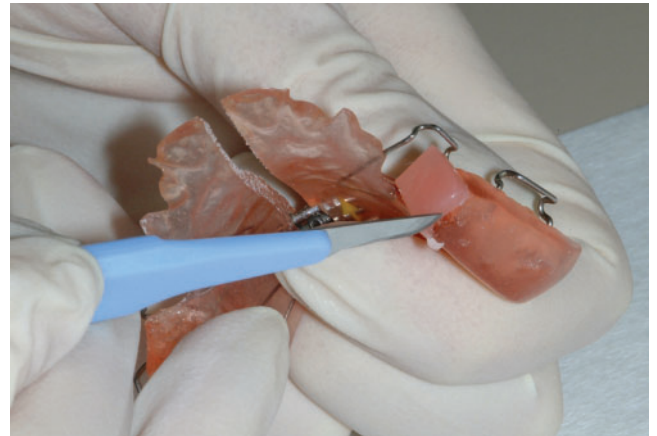


Figure 6 Getting correct fit on block



Figure 7 Occlude blocks before fully curing

- Place the upper appliance back into the mouth and ensure the addition fits against the upper teeth. Now encourage the patient gently to posture forward bringing the bite blocks together, ensuring even contact (Figure 7).



Figure 8 Curing light-cured acrylic

- Cure the acrylic intra-orally for 40 seconds (Figure 8) Remove the TB from the mouth and cure each addition for a further 2 minutes with the light. Degudent™ (www.degudent.com) also produce a visible light-curing box (Tungsten halogen light, 275W, €965) in which both sides can be cured simultaneously.
- Polish edges with a rubber cup if required.

Discussion

Re-activation of TBs is a useful part of contemporary orthodontic clinical practice.

The Triad visible light cure (VLC) acrylic resin system was introduced by Dentsply De Trey in 1983. This was superseded in the 1990s with a second-generation system 'Triad 2000'. It has previously been tested as an orthodontic base plate material, but was not found to be sufficiently durable.¹¹ However, as a material for simple re-activation of TBs, the material offers great potential. The new technique described here has some benefits over currently available methods.

The advantages of this approach are:

- quick, easy chairside activation within 5 minutes;
- cost-effectiveness;
- minimal residual monomer;
- minimal occlusal adjustment and polishing required;
- asymmetric activation possible;
- allows trimming of bite blocks to allow settling in deep bite cases;
- good occlusal contact in patients with increased vertical proportions.

Conclusion

The addition of light-cured acrylic provides an easy, and efficient way of re-activating TB appliances at the chairside. It can also be used to modify other removable appliances such as acrylic bite planes.

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