Case Series

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Clinical Application of Super-Bond C & B Resin Cement in Prosthodontics: A Case Series

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KEYWORDS

Super-Bond C & B, 4-META/MMA-TBB resin, adhesive resin cement, resin-bonded bridge, crown reattachment

ABSTRACT

Super-Bond C & B is self-curing adhesive resin cement based on the 4-META/MMA-TBB system, known for its strong and durable bonding to both hard dental tissues and multiple restorative substrates. This case series presents three clinical applications of the material: the fabrication of a direct resin-bonded bridge, the reattachment of a dislodged metal-ceramic crown, and the repair of a fractured ceramic facing in a fixed partial denture. Each case demonstrated successful retention, marginal stability, and aesthetic integration over a follow-up period of 6 to 12 months. The report underscores the versatility of the resin system and its relevance in conservative prosthodontic rehabilitation.

INTRODUCTION

Advancements in adhesive dentistry have significantly expanded the scope of conservative prosthodontics by enabling predictable adhesion to enamel, dentine, metal, and polymeric substrates. Super-Bond C & B (Sun Medical Co., Ltd., Kyoto, Japan), formulated with the 4-Methacryloxyethyl trimellitate anhydride / Methyl methacrylate – Tri-n-butyl borane (4-META/MMA-TBB) system, represents one such adhesive material that has demonstrated exceptional long-term reliability. In Super-Bond C & B, the conditioning agents include two activators: Green Activator, containing 10% citric acid and 3% ferric chloride, used primarily for dentine/enamel surface conditioning and smear layer removal; and Red Activator, containing a catalyst component that is mixed with the monomer to initiate polymerisation of the 4-META/MMA-TBB resin system. Green Activator enhances substrate penetration and bonding, whereas Red Activator functions mainly in the setting reaction of the adhesive resin. The synergistic action of the functional monomer 4-META and the polymerisation initiator TBB creates a stable hybrid layer, promoting strong adhesion even under challenging clinical conditions. Numerous investigations over several decades have confirmed the material's high bond strength, resistance to hydrolytic degradation, and favorable clinical longevity [1,2].

The present case series illustrates three distinct clinical scenarios where Super-Bond C & B was utilised to achieve durable and minimally invasive prosthodontic rehabilitation. These cases highlight its application in bonding a resin pontic, reattaching a metal-ceramic crown, and repairing a fractured ceramic veneer.

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CASE PRESENTATION

Case 1: Direct Resin-Bonded Bridge Using a Resin Pontic

A 24-year-old male presented with the loss of the maxillary right central incisor (tooth 11) secondary to trauma. As the adjacent teeth were intact and the patient requested a conservative option, a direct resin-bonded bridge was planned using a prefabricated acrylic pontic (Figure 1).

The enamel surfaces on the proximal aspects of the abutment teeth were conditioned with a 65%

phosphoric acid solution (red activator) for 60 seconds to enhance micromechanical retention. The acrylic pontic was similarly etched to increase surface energy and promote adhesive infiltration (Figure 2).

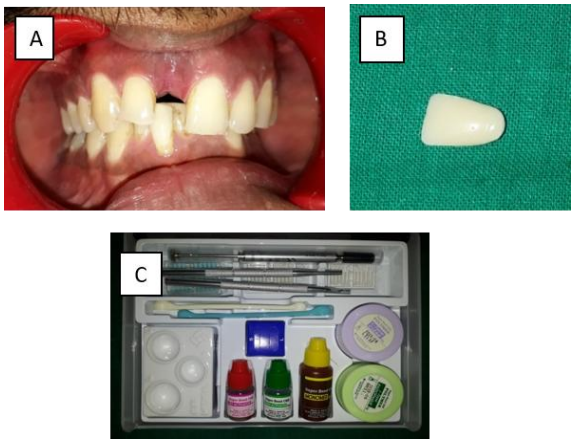


Figure 1 (A) Missing 11 (B) Acrylic tooth selection as a Pontic (C) Superbond C & B kit

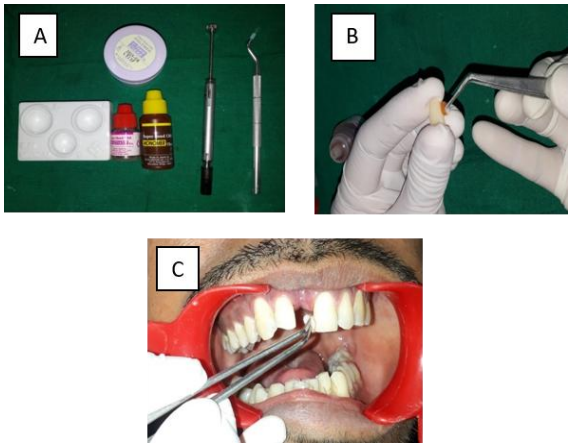


Figure 2 (A) Red activator (65% Phosphoric acid) for enamel etching (treating time-30-60 sec) (B) etching of acrylic tooth and (C) acid etching of tooth enamel

The resin cement was prepared by mixing one scoop of transparent ivory polymethylmethacrylate (PMMA) powder with four drops of 4-META monomer and one drop of TBB catalyst, allowing initiation of autopolymerisation. The activated resin mixture was applied to the conditioned enamel surfaces and the pontic using the brush-dip technique. The pontic was carefully positioned, and polymerisation was allowed to proceed without disturbance (Figure 3).

The restoration provided excellent aesthetics and satisfactory function. At the 6-month follow-up, the prosthesis showed stable colour matching, intact margins, and no evidence of debonding.

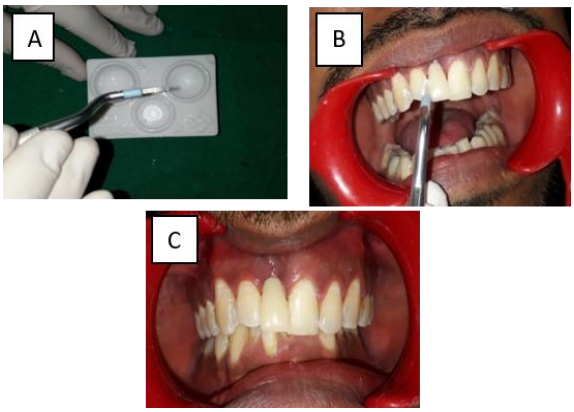


Figure 3 (A)1 scoop of transparent ivory PMMA mixed with 4 drops of activator (monomer) 4-META and 1 drop of catalyst TBB (B) initiated adhesive resin applied to adjacent teeth or abutments to bond the resin pontic using brush-dip technique (C) resin –bonded fixed dental prosthesis

Case 2: Reattachment of a Dislodged Metal-Ceramic Crown

A 38-year-old male attended the clinic with a dislodged metal-ceramic crown from the maxillary left canine (tooth 23) 2 days back. The tooth had been previously endodontically treated, and the crown had detached due to compromised adhesion. The remaining tooth structure was also compromised (Figure 4). A periapical radiograph was taken during clinical assessment to evaluate the integrity of the previous endodontic treatment and periapical status, with no evident pathological changes noted. The exposed gutta-percha was carefully assessed clinically for contamination. As there were no signs or symptoms suggestive of endodontic failure, no radiographic evidence of periapical pathology, and the existing root canal filling appeared satisfactory, retreatment was not considered necessary at that stage. The exposed area was disinfected appropriately before re-cementation, and the patient was advised periodic follow-up for monitoring.

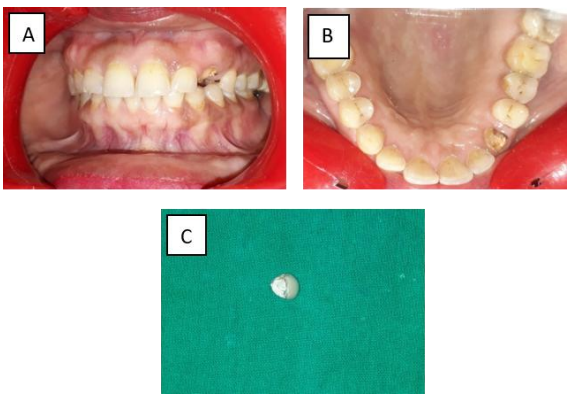


Figure 4 (A-C) Dislodged metal ceramic crown in 23 endodontically treated

The inner metal surface of the crown was treated with a metal primer for 60 seconds to improve chemical affinity with the 4-META/MMA-TBB system. The exposed dentine was conditioned with green activator composed of 10% citric acid and 3% ferric chloride, which effectively removed the smear layer and enhanced monomer penetration for 10 seconds, then rinsed thoroughly with water and gently air-dried prior to application of the bonding resin.

Opaque ivory Super-Bond C & B was mixed using the bulk-mix technique, resulting in a homogeneous resin mixture. The cement was applied to both the conditioned crown interior and the dentine surface. The crown was then repositioned with firm finger pressure, and excess resin was removed after polymerisation (Figure 5).

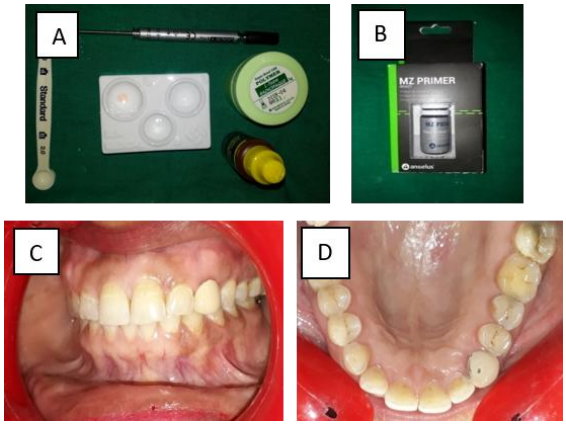


Figure 5 (A) Superbond C & B adhesive cement with opaque ivory resin (B) metal primer was used to etch the inner surface of crown and dentine was etched using green activator (10 % citric acid + 3 % ferric chloride and bonding agent was applied (C) & (D) Resin bonding of metal ceramic crown to tooth

At the 12-month recall, the crown remained firmly attached, exhibiting no marginal discolouration or microleakage. Functional loading was stable, confirming the high retention capability of the adhesive system in cases of crown debonding.

Case 3: Repair of a Fractured Ceramic Facing in a Fixed Partial Denture

A 55-year-old female presented with a fractured porcelain veneer on tooth 45, which formed part of a three-unit fixed partial denture replacing tooth 46. The fracture exposed the underlying metal framework, resulting in aesthetic and functional limitations.

The metal substrate was treated with a metal primer for 60 seconds to ensure optimal bonding with the resin system. An opaque resin layer was first applied to mask the dark colour of the metal and recreate the basic dentine shade. Incremental composite veneering (each increment light cured for 20 seconds) was subsequently carried out to restore the anatomical contour and shade of the original prosthesis (Figure 6).



Figure 6 (A) Dislodged ceramic facing in 45 region of 3-unit fixed partial denture replacing missing 46 (B) metal primer applied (C) opaque resin applied to mask metal colour and composite build-up done

The repaired veneer demonstrated excellent aesthetic integration immediately after the procedure. At the 12-month follow-up, the restoration remained intact with no signs of discolouration, debonding, or surface degradation. All cases are shown in a tabulated form (Table 1).

Table 1 Descriptions of three cases and the outcomes

Case	Age/ Sex	Type of Restoration	Substrate	Follow-up	Outcome
1	24/M	Resin-bonded bridge	Enamel-acrylic	6 months	Intact margins, aesthetic match
2	38/M	Crown reattachment	Dentine-metal	12 months	No leakage, good retention
3	55/F	Ceramic facing repair	Metal-composite	12 months	Stable colour and contour

DISCUSSION

The three cases presented in this report highlight the versatility and effectiveness of the 4-META/MMA-TBB adhesive system across a range of restorative situations. The functional monomer 4-META promotes chemical interaction with hydroxyapatite, while TBB initiates a robust free-

radical polymerisation reaction even in slightly moist environments. This combination results in the formation of a durable hybrid layer, imparting high bond strength and long-term stability [1,2]. Recent studies have further demonstrated the system's value in both clinical and laboratory settings. Investigations have reported its efficacy in root fracture reattachment, improved bonding to hybrid ceramics, and biofunctional responses when modified with nano-hydroxyapatite [3]. Sugii H et al., 2024 and Nafisifard M et al., 2024 had studied the bioactive behavior of modified 4-META resins containing nano-hydroxyapatite and effect of 4-META on microtensile bond strength of silane to hybrid and zirconia-reinforced lithium silicate ceramics [4,5]. Long-term clinical studies documenting prosthesis survival for more than four decades emphasize its remarkable durability [6]. Comparative evaluations have shown its superior bond strength to metal, enamel, and ceramics when compared with self-adhesive cements [7]. Moreover, long-term clinical data confirm survival of fixed restorations up to 43 years when retained with 4-META/MMA-TBB cement compared to zinc phosphate cement [8].

Despite its proven versatility, Super-Bond C & B remains technique-sensitive, requiring strict moisture control and accurate surface conditioning. Aoki K et al. (2011) reported long-term degradation of the hybrid layer and reduced bond strength, indicating limited aging stability [9].Tanaka Y et al. (2004) also noted early bond deterioration and microleakage on cementum surfaces, emphasizing sensitivity to substrate and isolation [10]. In addition, Saito et al. (2005) demonstrated that thermal cycling and etching protocols significantly influence bond durability, highlighting the importance of precise handling [11]. Although technique sensitive, Super-Bond adhesive is relatively tolerant to minor blood and moisture contamination, as polymerisation of the tributylborane (TBB)-initiated system is enhanced in the presence of moisture and oxygen. Therefore, when the recommended clinical protocol is followed, consistent and predictable outcomes can be achieved (Morotomi et al., 2016) [12]. Despite these further long-term studies are required to check its clinical effectiveness and any side effects. This report is a descriptive case series of three cases without a control group or standardized outcome assessment; therefore, it provides a low level of evidence. The findings demonstrate clinical feasibility and short-term success but do not establish comparative effectiveness or long-term superiority. Larger controlled studies with standardized outcome measures and longer follow-up are needed to confirm these results. Another limitation that the outcome measures were subjective and no objective criteria was assessed.

CONCLUSION

Within the limitations of these case series, Super-Bond C & B demonstrates strong potential as interim adhesive resin cement for conservative prosthodontic procedures. Its ability to bond reliably to enamel, dentine, metal alloys, and acrylic or composite substrates positions it as a valuable material in restorative dentistry. The cases presented confirm its effectiveness in resin-bonded bridges, crown reattachment, and ceramic veneer repair, with stable functional and aesthetic outcomes observed over follow-up periods of up to 12 months. With strict adherence to correct clinical technique, this adhesive resin system can provide predictable and long-term success.

DECLARATION OF INTEREST

Authors declare no conflict of interest.

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