SPLINTING WITH 4 META/MMA-TBB SELF CURE ADHESIVE SYSTEM – A NOVEL APPROACH

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ABSTRACT
A variety of treatment modalities, for mobility of teeth. To treat the mandibular anterior mobile teeth is the most challenging tasks; to splint the mandibular teeth is appreciable approach and is the fastest, simplest and most predictable. This case report presents a successfully accomplished stabilization of mandibular teeth with grade II mobility with resorption of bone seen radiographically, by using 4-META/MMA-TBB self-cure dental adhesive resin cement (Cand B bond). This present treatment modality offers a conservative, aesthetic and noninvasive treatment which can be considered as a longlasting treatment. The purpose of this report is to present a case of successful stabilization of teeth by using Cand B bond.

KEYWORDS:

INTRODUCTION
Periodontitis is an inflammatory disease of supporting tissues of teeth caused by specific microorganisms or groups of specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone with periodontal pocket formation, gingival recession or both. Progressive alveolar bone loss around the involved teeth eventually results in increased mobility. Increased tooth mobility adversely affects function, aesthetics, and the patient’s comfort. For stabilisation of hypermobile teeth, splinting is the ideal treatment. According to AAP Splint is any apparatus, appliance, or device employed to prevent motion or displacement of fractured or movable parts. Dawson defines splinting as the joining together of two or more teeth for the purpose of stabilization. Splitting is valuable in ensuring the retention of periodontally compromised tooth and positively affecting the longevity. Splinting teeth to each other allows distribution of forces from mobile teeth to their immobile neighbours, thereby gaining support from stronger teeth. This prolongs the life expectancy of the loose teeth, gives stability for the periodontium to reattach, and improves comfort, function and aesthetics. Vályi et al reported that the stabilization of mobile teeth with splint allow the same healing as of immobile neighbours, thereby gaining support from stronger teeth. Splinting has also been shown to promote healing following periodontal surgery in localized aggressive periododontitis with resultant significant bone gain.

One of the various adhesive used in splinting is superbond adhesive which has the strong bond strength, simple positioning, highly biocompatible and have esthetically appealing look. Superbond adhesive, a self-curing dental cement adhesive based on acrylic resin material, utilises ‘4-META’ (4-methacryoxyethyl trimellitate anhydride) as a polymerization promoter. Although the dental adhesive 4-META/MMA-TBB self-cure dental adhesive resin cement method was recently launched in India (Super-Bond C&B by Sunmedical Co.), it was developed for general dental adhesive use in Japan in 1983. Over the years, it has built its reputation as a biocompatible dental cement adhesive with a strong bond strength.

Classification Of The Splint
There are a variety of methods for splinting teeth. They can be categorised on the basis of their function and duration of use, the position of the splinted teeth in the jaw and the method of manufacture.1-11

1. Splints are categorised as metallic, non-metallic and a blend of metallic and non-metallic forms on the basis of materials.12 Metallic forms are typically made of stainless steel, chromium cobalt and cast metal, while non-metallic types are made of acrylic and composites.

2. Splints are classified as fixed and removable on the basis of fabrication method12

3. Splints are graded as extra coronal and intracoronal on the basis of the position of splinted teeth.

a. Extracoronal splints: In this technique, a stabilising wire, a fiber-reinforced ribbon or equivalent stabilising device is secured to the exterior of the teeth like a fixed orthodontic retainer. Other examples include tooth-bonded plastic, night guards and welded bands.

b. Intracoronal splints: a slot is milled into the damaged teeth and the stabiliser is inserted into the slot and bonded in place. This makes this kind of splint less noticeable for an aesthetic supremacy. Examples cover inlays and nylon wires.

4. Splints are categorized as temporary, Provisional or permanent on the basis of duration and purpose.12,13

a. Temporary splints: Temporary splints are those utilized for less than 6 months during periodontal therapy that can or may not contribute to other forms of splints. It is used to minimise undesirable occlusal forces for a brief amount of time in post-acute trauma, as a protective intervention in the management of advanced periodontal disease and for anchorage in orthodontic treatment. Temporary splints may be removable, fixed external, fixed internal forms. Examples of removable temporary splints include Elbrecht cast metal splints, Hawley acrylic splints or other forms of orthodontic appliances, bite guards or night...
Surface preparation

After rinsing and polishing, the teeth surfaces have been contoured. After phase I therapy, occlusion was done with respect to the opposing dentition without caries or periodontitis. The patient had a dentition without caries or periodontitis. Generalized recession with mobility grade II. The anterior teeth with generalized plaque and calculus. The teeth were properly rinsed and cleaned. Polishing brush and oil-free, fluoride-free pumice. The activator was applied for about 30 seconds using a sponge swab to handle the tooth surfaces and wipe them dry. The activator shall be extended until an appropriate maintenance time is too long, the tooth surface will be insufficiently altered, but if the duration is too short, the tooth surface will be severely modified that it becomes brittle or so heavily demineralized that Super bond monomers (4-META/MMA-TBB) can not penetrate entirely into demineralized dentin. After treatment procedure, the activator must be completely rinsed.

(c) Isolation of treated surfaces: After proper treatment of the adhesive surface, it is important to keep the surface dry. Contamination may occur by saliva, blood, water, oil or human breath, therefore rubber dam or cotton roll isolation is recommended. In some cases with hypermobile teeth, it can be impossible to position a rubber dam, and a gingival dam is recommended as an option in such situations to avoid interaction with adhesive monomer and polymer with oral soft tissue and to eliminate adhesive leakage to neighbouring surfaces that are not meant to be bonded.

Super-Bond's excellent adhesive properties to enamel, metal, plastic and porcelain make it useful for bonding a wide variety of orthodontic appliances. If tooth has slight mobility, it was splinted directly to the adjacent teeth. Because Super-Bond resists degradation in saliva, it creates an effective marginal seal between tooth and restoration. It not only bonds the restoration securely to the preparation to resist dislodging but also prevents leakage and secondary caries.

Fig1: Self-curing Adhesive Resin System (super-bond C&B)

Superbond can be applied in two techniques which can be either Brush dip or Bulk blending technique. Fracture and chipping can be quickly healed using a brush dip technique.

Brush-dip technique: The brush-dip process can be performed for around 5 minutes as long as the activated solvent stays active providing greater monitoring and precise application of the adhesive at the appropriate interdental touch points during the splinting procedure. As the powder / liquid ratio is higher in the brush dip technique than in the bulk blending technique, the working time of the mixed ball is relatively short and the curing time is longer than in the bulk mixing technique. The curing time of the brush-dip technique was estimated to be between 5 and 6 minutes at 37 °C. Using a sterile dispensing bowl, a sufficient quantity of polymer powder was dispensed to the well “P” of the dispensing bowl. Fresh polymer powder should be separated from the container at any time. Do not use old powder left over from other operations. Do not add the remaining substance to the container because it might have been tainted with the activated oil.

An acceptable amount of drops (4 drops) was applied to the well “L” of the dispensing bowl during which one drop of the catalyst must be completely mixed. The powder / liquid ratio is higher in the brush dip technique than in the bulk blending technique, the working time of the mixed ball is relatively short and the curing time is longer than in the bulk mixing technique. The curing time of the brush-dip technique was estimated to be between 5 and 6 minutes at 37 °C. Using a sterile dispensing bowl, a sufficient quantity of polymer powder was dispensed to the well “P” of the dispensing bowl. Fresh polymer powder should be separated from the container at any time. Do not use old powder left over from other operations. Do not add the remaining substance to the container because it might have been tainted with the activated oil.
Excessive fluid was removed by applying the tip of the brush to the edge of the well. The brush is struck by the polymer powder in the “P” well. A small powder ball was picked up on the dump tip of the instrument. The Powder ball was rubbed onto the pre-wet surface of the contact points of the movable teeth. As soon as the brush reached the desired root surface, the powder dispersed to create a smooth, homogeneous coating. The process was repeated until the target surface was coated with cement. After each procedure, a gauze was used to clean the resin from the brush before dipping back into the oil. The brush with the pointed end brush tips (White) should be used in the brush – dip technique and these brushes are only used for one time.

(1) Diffusion of monomers into the demineralized dentin surface,
(2) Graft polymerization of PMMA onto dentin collagen, and
(3) Rapid initiation of polymerization at the resin-dentin interface.

Bond strength was affected both favourably and negatively by glutaraldehyde at 17,18 based on its concentration. Bond strength was lowered by sodium hypochlorite, hydrogen peroxide, cresol, eugenol and phenol camphor. Applying ascorbic acid to the dentine treated with Sodium hypochlorite will also regain the strength of the bond. In post-polymerisation behaviour, TBB varied from other polymerisation initiator mechanisms including BPO / DMPT and CQ / DMAEMA. A smaller volume of residual monomer and a decrease in polymerised MMA resin over the long run have been caused by the use of TBB. Resin polymerisation is never an adequate state required for adhesive bonding. Various processes have been suggested for the development of durable dentine bonded MMA / TBB resin, including the dissemination of monomers into dentins, the graft polymerisation of resin into dentin collagen and the interfacial initiation of polymerisation.

CONCLUSION
Mobile teeth splinting is advocated for restoring function and comfort by developing a stable occlusion to encourage tooth retention and periodontal health maintenance. In contrast with other conventional methods of splinting the direct resin fixing procedure, used with 4-META/MMA-TBB self-cure dental adhesive resin cement was found to be comparatively simpler and provides high bio-compatibility, strong bonding strength, aesthetic results and immediate stability much better than the majority of periodontal splint material that were available.

REFERENCES
1. Rajiv Saini, P P Marawar, Sujata Shete, and Santosh Saini.Periodontitis, A
4. Zhang X. Effect of wire ligature splint reinforced with preparing groove and employing composite mate-