



Single Sided Bonded Space Maintainer, New Challenge Towards The Conventional Ones- A Case Report With 12 Month Follow Up

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Abstract

Preventive orthodontic interventions like maintaining the space due to early loss of primary teeth, with appropriate technique should be initiated in the primary prevention level so as to prevent malocclusion of the developing dentition and also can bring favorable developmental changes. RIBBOND is a lenowoven polyethylene fiber ribbon which has paved it's path in dentistry from a long time ago through different applications. Though banded space maintainer has been considered gold standard, still there are some flaws noticed. So, to overcorrect those mistakes bonded space maintainers are a great hit. Within the bonded types, major popularity has been gained by RIBBOND and different pattern and fabrication method has also been tried. So, in this case study single sided that is only buccally bonded RIBBOND has been used successfully to maintain a premature space for an adequate period of time.

Keywords: Space maintainer, Bonded, Single sided, RIBBOND

Introduction

According to Boucher, space maintainer is defined as a "fixed or removable appliance designed to preserve the space created by the premature loss of a primary tooth or a group of teeth" [1]. Space maintainer is utmost necessary when there is any premature loss of primary teeth as it has the following functions in terms of speech, chewing, appearance, prevention of bad habits and also in the guidance and eruption of permanent teeth [2]. So, to prevent any undesirable mesial and distal movements of primary and permanent teeth, resulting in loss of the arch length and to also maintain a balanced occlusion the most commonly used space maintainer is band and loop type [3]. Now, space maintainers can be classified as removable and fixed types which are further classified as banded and bonded, active and passive, functional and nonfunctional [4].

Although banded type space maintainers like band and loop is the conventional one still it possess certain disadvantages. To overcome the shortcomings directly bonded space maintainers such as fiber-reinforced composite resins (FRCR) as fixed space maintainers nowadays have gained much popularity [5, 6]. The most popular types are glass fibers and ultra high molecular weight polyethylene fiber ribbon [3]. Different studies till now have discussed about both sided including buccal and lingual fabrication of RIBBOND, few literature have been found about the single sided RIBBOND technique. For this reason this case study particularly focuses on this unique single sided RIBBOND space maintainer technique.

Method

A 6 year 5months old female patient reported with a chief complaint of grossly decayed tooth in the right

lower posterior teeth region. Due to previous bad dental experience the patient's behavior was negative according to Frankl's Behavior Rating Scale. Proper behavior management was done until the patient became cooperative. Upon intraoral examination it was found that the patient had restored tooth in relation with 74, occlusal caries limited to dentin in 75, distoproximal caries in 84 and grossly decayed 85 (figure 1). On intraoral periapical radiograph it was seen that the roots of 85 were resorbed more than $\frac{2}{3}$ rd of its length, with the successor tooth in Nolla's stage 4 of development (figure 2). 75 and 84 were restored with silver reinforced glass ionomer cement (Hi-Dense Xp Eco Pack, Shofu, Japan) and 85 was extracted. The amount of ribbon (RIBBOND, Seattle, WA, USA) to be placed was measured with vernier caliper on the study cast.

After healing of extraction socket, 7 days later the next procedure was performed. After isolation with rubber dam buccal surfaces of both the abutment teeth were cleaned with pumice slurry, were etched, bonding agent (3M ESPE) was applied and was cured for 20 s. Measured length of RIBBOND was dipped in dual cure composite resin (Calibra Ceram, Dentsly Sirona). After that a thin layer of flowable composite (Nexcomp Flow, Meta Biomed, Europe) was applied on the buccal surface of abutment tooth, and RIBBOND was placed on this composite, extending on buccal aspect from mesial abutment to distal abutment tooth. At the end the fiber was curved and adapted with a teflon coated filling instrument, according to the proximal surfaces of the abutment tooth for better encircling and to prevent dislodgement, followed by curing of the fiber framework for 5–10 s. An additional layer of flowable composite was applied over the entire fiber frame, and this was light cured for 40 s. Another blob of restorative composite was again added and cured at the fiber-enamel interface to prevent fracture. Then finally space maintainer was checked for any occlusal and gingival interference. Lastly finishing was done with composite finishing burs (figure 3). The patient was recalled at 3, 6 and 12 months, and the fiber framework was intact (figure 4). Although a minute fracture line was observed at the tooth composite interface at 3rd month, it was soon restored.

Discussion

RIBBOND consists of bondable, reinforced ultra-high strength polyethylene fibers with lock-stitch feature design that transfers forces throughout the weave without stress transfer back into the resin [7]. Ribbon fibers increases flexural strength and fracture toughness of composite resin restorations and thus help prevent fracture against masticatory forces [8]. The weave is open enough to allow for efficient infusion and wetting of the resin on the fibres and ease of handling. RIBBOND is biocompatible, esthetic, fast without much laboratory procedure, with clinical longevity and high patient acceptance. It has been used successfully for tooth splinting, replacement of missing teeth, reinforcement of provisional acrylic resin fixed partial dentures, and orthodontic retention [9]. Recently RIBBOND as a space maintainer is being the new trend.

Previously when fibers were used as a bridge it was subjected to compressive and tangential forces that lead to fracture of fiber frame [10]. Then it was placed on lingual side to reduce the stress, but showed a failure rate of 67%-94% [11]. In this case, improvised design by placing on the buccal aspect of the abutment teeth provided adequate surface area for firm bonding with minimum stress and interference from tongue [3]. RIBBOND gives the opportunity for immediate esthetic and functional rehabilitation where minimal patient cooperation is required, and the treatment takes less chairside time without any impingement during band fabrication thus, readily accepted by the patient [9].

Conclusion

It can be finally concluded that ribbon fiber along with composite material provide a good alternative to conventional band and loop space maintainers. Although there have been certain failures in fabrication method of previous technique of ribbon, this recent buccally placed ribbon shows us a promising result with high patient acceptance, and with acceptable range of longevity; further more studies will be required to make it more successful.

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Figure Legends



Figure 1: Pre operative intraoral view



Figure 2: IOPAR of 85 showing resorption of roots



Figure 3: Immediately after fabrication of single sided RIBBOND space maintainer



Figure 4: Intact RIBBOND after 12month followup