

CORRESPONDENCE



ILL effects of Conventional band and loop space maintainers: Time to revolutionise

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Abstract

Background: Premature loss of primary teeth due to caries, trauma, or any other cause ultimately leads to undesirable movement of primary and/or permanent teeth resulting in arch length deficiency. Such a loss can produce or increase the severity of malocclusions with rotations, ectopic eruption, crowding, excessive overjet and overbite, unfavorable molar relationships, and crossbite. Pediatric dentist as a part of managing developing occlusion prefers the use of space maintainers to eliminate or decrease the severity of such malocclusions. Fixed space maintainers are usually indicated to maintain space created by unilateral/bilateral premature loss of primary teeth in either of the arches. Of the various fixed space maintainers, band and loop type is most frequently used. Even though it has high success rate and good patient compliance, there are disadvantages in its construction and longevity.

Aim: In the present case series, we highlight ill effects of conventional band and loop space maintainers with appliance acting as plaque retentive causing gingival enlargement, mucosal overgrowth on the loop, band displacement causing blanching of gingiva, loop impingement on the mucosa causing ulceration, pain, and cement disintegration around the band.

Conclusion: In the era of bondontics and with the advent of newer materials such as fiber-reinforced composite resin system (FRCR), now, it is the time to revolutionize the conventional band and loop space maintainers to overcome the disadvantages.

Clinical Significance: FRCR as space maintainers are esthetic which is need of the hour in the present century, easy to clean, does not impinge on the soft tissue and with no laboratory procedure involved.

Introduction

Primary dentition plays a very important role along with guidance and eruption of permanent teeth considering child's growth and development in terms of appearance, prevention of bad habits, and speech. Premature loss of primary teeth leads to undesirable tooth movement causing loss of arch length which results in malocclusion in permanent dentition. Space maintainers maintain the space created by premature loss of deciduous teeth and prevent further malocclusion.

Fixed space maintainers are usually indicated to maintain the space created by unilateral/bilateral premature loss of primary teeth in either of the arches. They are easier to maintain and are less likely to be damaged, lost, or removed. Contraindications for

all space maintainers are children with poor oral hygiene, high caries rate, and children with irregular attendance, as the gingival tissues may grow over the space maintainer, necessitating surgical removal of the appliance.^[1]

Of the various fixed space maintainers, band and loop type of space maintainers are one of the most frequently used appliances ever since with high success rates.^[2] In spite of good patient compliance, solder failure, disintegration of cement, caries formation along the margins of band, and long construction time are some of the disadvantages associated with them.

In this case report, we highlight the ill effects caused by conventional fixed space maintainer.

Case 1

A male patient aged 10 years reported with chief complaint of loose tooth in the lower left back tooth region. Parent gave a history of visiting the dentist for removal of tooth followed by placement of space maintainer in lower back tooth region 2 years back and failed to return for follow-up appointments.

On intraoral examination, bilaterally reverse band and loop space maintainer were seen cemented to 74, 84 [Figure 1]. Oral hygiene was poor and there was generalized marginal gingivitis. Huge lump of calculus was found attached to the loop on the lingual aspect causing depression, inflammation of mucosa below and around space maintainer cemented to 84 with lingual displacement of band, and preshedding mobility of the tooth [Figure 1]. Tissue overgrowth on the loop and impingement of the loop was noticed with space maintainer cemented to 74 [Figure 1].

Case 2

A male patient aged 9 years reported with the chief complaint of pain in the lower left back tooth region. Parent gave the history of child undergoing extraction of tooth and placement of space maintainer in the same region 1 year back. On oral examination, band and loop space maintainer was cemented with the loop impinging on the buccal mucosa causing ulceration along the loop. Cemented band was dislodged subgingivally and caused severe blanching of gingiva around the tooth [Figure 2]. With persisting signs and symptoms, the cemented space maintainer was removed.

Discussion

In the present case series, poorly constructed loop of the space maintainer acted as a plaque retentive area which resulted in the formation of calculus and also tissue overgrowth, impingement of the loop causing ulceration on the buccal mucosa eliciting pain. Ill-fitting band was resulted in lingual displacement and blanching around the tooth. With the advances in the technology and materials, there is a need to search for an alternative to overcome these various disadvantages^[2,3] of the band and loop space maintainer.

Fixed spaced maintainers have seen certain changes ever since the process of acid etching was reported by Buonocore^[4] stating that the process could increase the rate at which resin holds on to the surface of the enamel. In an era, where dental esthetics on the minds of adolescents and children, pediatric dentists aims to incorporate esthetics while delivering space maintainers by giving esthetic space maintainers to children.^[5]

One such alternative for conventional space maintainer can be fiber-reinforced composite resin (FRCR) technology which includes composites that are reinforced with glass fibers or polyethylene fibers will result in materials with enhanced mechanical properties,^[6,7] i.e., stiffness, strength, toughness, and fatigueness. This can be directly bonded to natural tooth in the

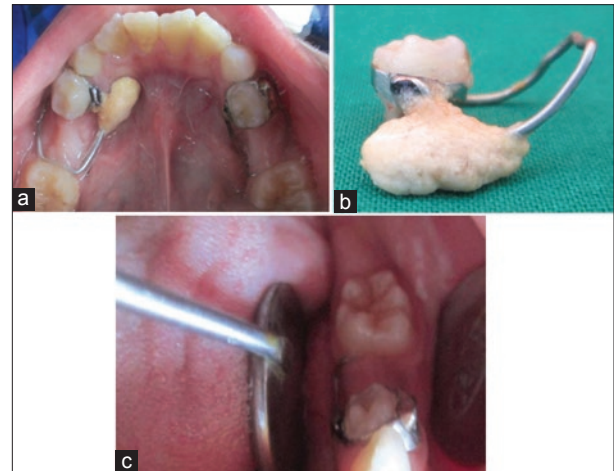


Figure 1: a - Intraoral view showing reverse band and loop cemented to 74,84, b - calculus deposit on the loop, c - tissue overgrowth on the loop



Figure 2: Ulceration due to impingement of loop on the buccal side

form of bridge, with its saddle bonded to both teeth (mesial and distal to edentulous space) and this saddle is actually maintaining the required space for permanent successor.^[8] It can also be used in the form of loop which simulating the conventional stainless steel band and loop space maintainer.^[9]

FRCR space maintainers do not have any contact with adjacent periodontal tissues, thereby eliminating periodontal problems afflicted with conventional fixed space maintainers which were obvious in the present case. McDonald and Avery suggested that the band and loop space maintainer should be removed once a year to inspect, clean, and apply fluoride to the tooth.^[10] These annual maintenance steps can be eliminated by FRC loop space maintainer and offer several benefits as reported by Kargul *et al.*^[11,12] are esthetics, easy acceptance of patients, less time-consuming, good bonding properties, strength-to-weight ratio is superior

than most alloys, adaptable to tooth contour, natural feel, biocompatible, no tarnish and corrosion can be used in metal allergy and ease of repair.

FRCR as space maintainer is clinically acceptable, excellent esthetic choice and expedient alternative to the conventional band and loop appliance in pediatric dentistry.^[9,13] Gajanan *et al.* concluded that FRC (ribbond) space maintainers, as well as repaired ribbond space maintainer, are comparable to the conventional band and loop in terms of physical strength.^[14] Saravanakumar *et al.* in his study stated that FRCR can be successful space maintainer only for short periods and its success depends on operator experience, choosing suitable patient group, and proper isolation.^[15] Garg *et al.* on comparative evaluation of conventional band and loop space maintainer with the FRCR space maintainer in children stated that patient acceptance was better, time taken was significantly lower, superior in terms of clinical efficacy for FRCR space maintainer.^[16]

However, on contrary Setia *et al.*^[8] stated that the hanging fiber bridge is subjected to compressive and tangential forces from the fiber frame to the bonding margins between tooth and (FRC) ribbond on either side of the framework might have weakened the bond and would have caused debonding of fiber composite interface or enamel cement interface.

Further, long-term studies are required for its improve its longevity and to completely replace conventional space maintainers.

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