

Case Report: A Novel, Fixed Chairside Space Maintainer

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Abstract

Introduction: To prevent the dental arch deficiency after untimely loss of primary teeth, a space maintainer is employed. Space maintainers currently in use like band and loop are considered a non-aesthetic appliance. Light Cured Acrylic Resins LCAR are commonly utilized in dental practice. They provide the essential mechanical and physical properties with the necessary characteristics to be used in diverse functions in dentistry. **Aim:** To provide an aesthetic alternative space maintainer after premature extraction of second primary molar. **Case Description:** An eight-year-old healthy boy reported with a recently missing lower left second primary molar. A pink color sheet of LCAR Triad® VLC (Custom Tray) product was used to construct a space maintainer. After complete examination, full arch isolation was performed using rubber dam and suction. Both the abutment teeth were cleaned with pumice slurry and then etched with 35% orthophosphoric acid for 30 seconds for primary first molar and 20 seconds for the permanent first molar. The teeth were rinsed, air-dried, and wetted with an adhesive that was light-cured for 20 seconds. A thin layer of flowable composite was applied to the buccal surfaces of the abutment teeth without light-curing it. The cut length of LCAR was placed over the flowable composite extending from the buccal aspect of permanent first molar to buccal aspect of the primary second molar. The ends of the LCAR were adapted to the teeth surfaces with a plastic instrument. The composite and LCAR was light-cured for 2 minutes. for each end of LCAR. **Conclusion:** This case report showed that the Light Cure Acrylic Resin space maintainers can be a new alternative to the traditionally fixed space maintainers used in pediatric dentistry.

Keywords: Early loss of primary molars, fixed space maintainer, light-cured acrylic resin

INTRODUCTION

Premature loss of primary second molars may result in undesirable movements of primary and permanent teeth, leading to space loss and arch length insufficiency.^[1] Subsequently, space loss can produce or increase the severity of malocclusions, such as crowding, and unfavorable molar relationships.^[2] The amount of space loss in the mandible is more considerable than in the amount of space lost in the maxilla after premature loss of the primary tooth.^[3-5] Moreover, the space loss could be higher if a primary second rather than primary first molar was lost.^[6]

To prevent wastage of arch length, and perimeter by maintaining the relative position of the existing dentition, a space maintainer is employed after a premature sacrifice of the primary tooth.^[7]

Space maintainers currently in use include fixed and removable appliances. Although removable space maintainer is easy to fabricate and restore functions and esthetic, removable

space maintainers are more frequently lost than fixed space maintainers.^[8,9]

Fixed space maintainers such as band and loop had a suitable success rate. However, the cement dissolution, solder failure, caries formation along the margins of the band, and long construction time are some of the disadvantages associated with them. It is also considered a nonesthetic appliance due to its metallic appearance.^[10]

Fiber-reinforced composite is an esthetic material recently used as a space maintainer. However, the material is flexible, resulting in enormous displacement for a certain amount of force compared to Band and Loop.^[11]

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Acrylic-based, light-cured resins are frequently used in daily dental practice, as they can provide the essential properties and necessary characteristics to be used in diverse functions. The most common use of the materials includes custom trays, temporary crowns, and removable orthodontic appliances.^[12,13]

This case report represents a novel, straightforward, chairside made, and esthetic rehabilitation of missing primary second molar with fixed space maintainer.

CASE REPORT

An 8-year-old boy accompanied by his parents reported with a recently missing lower left second primary molar. The teeth were extracted 1 week previously owing to pain and decay although his medical history was noncontributory. Intraoral examination of the patient revealed the presence of a complete primary dentition, except for upper and lower right lateral incisors, the presence of permanent upper and lower central incisors, and erupting lower left lateral incisor.

The mandibular left second primary molar space could easily be detected at first examination [Figure 1].

Occlusion relationship revealed mild Class III molar relationship [Figure 2].



Figure 1: Missed lower left second primary molar.



Figure 3: Panoramic view showing extracted lower right second primary molar.

Subsequent radiographic examination clarified the situation [Figure 3].

On completion of thorough case evaluation, it was planned to place fixed space maintainer replacing #75. After obtaining written parental consent, the preoperative occlusal analysis was performed.

Technique for Light Cure Acrylic Resin application

Preparation of the LCAR

A pink sheet of LCAR was used to construct the space maintainer.

To determine the length of light-cured acrylic resin required, the distance between the buccal grooves of the lower first permanent molar and distobuccal line angle of the first primary molar was measured using a vernier caliper.

A bar of 16-mm length (according to taken measures) was cut from LCAR sheet by spatula [Figure 4].

A 3 mm that forms both ends of LCAR was wetted with an adhesive (Adper Single Bond-2® 3M) that was light-cured for 20 s.



Figure 2: Occlusion relationship.



Figure 4: A bar of 16-mm length was cut from LCAR sheet by spatula.

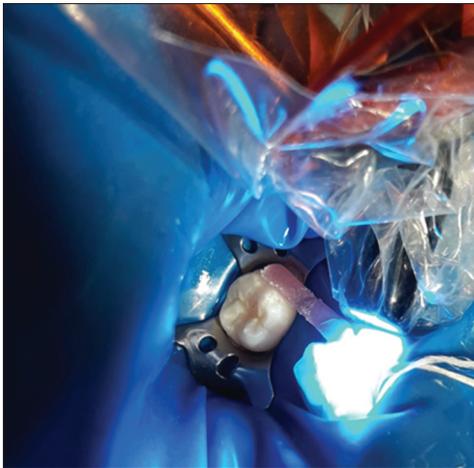


Figure 5: Postoperative photograph showing LCAR in place.

Abutment preparation

After administration of adequate anesthesia, isolation was done using a rubber dam and suction. Both the abutment teeth were cleaned with pumice slurry and then etched with 35% orthophosphoric acid for 30 s for primary first molar and 20 s for the permanent first molar. The teeth were rinsed, air-dried, and wetted with an adhesive (Adper Single Bond-2® 3M) that was light-cured for 20 s. A thin layer of flowable composite (Filtek Z350® 3M) was applied to the buccal surfaces of the abutment tooth without light-curing it. The cut length of LCAR was placed on this flowable composite, extending from the buccal aspect of the permanent first molar to buccal aspect of the primary second molar. The ends of the LCAR were adapted to the teeth surfaces with a plastic filling instrument. The composite and LCAR were light-cured for 2 min for each end of LCAR [Figure 5]. The rubber dam was removed and then the occlusion was checked for any prematurity, and gingival clearance was evaluated [Figure 6]. The child was instructed for oral hygiene with restrictions on how to clean the tooth with the appliance. He was also instructed not to swallow if the appliance was detached and emergency instructions were given to the parents for such situation.

DISCUSSION

One of the critical functions of the primary tooth is to occupy the physiological space and guide the eruption of its permanent successor.^[14] Precocious loss of primary molars without adequate intervention may result in space loss for successors. It has been reported that following extraction of the primary first molar, there is a space loss of 1.5 mm in the mandible and 1 mm in the maxilla.^[15]

Early loss of the primary molars had a significant effect on dental arch length and resulted in 2–4 mm of space closure per quadrant in both arches. The most considerable space loss had been attributed to mesial movement of the permanent molars.^[16]

The fixed space maintainer is indicated to preserve dental arch integrity; however, the conventional band and loop space



Figure 6: Postoperative photograph showing occlusion checked for any prematurity and gingival clearance was evaluated.

maintainer may not esthetically accept due to its metallic appearance.

In this case, light-cured acrylic resin was first time used as a fixed space maintainer. The author found that it was enthusiast after a demonstration on the model due to the pink color LCAR.

The use of light-cured acrylic resin in the dental field is increasing along with experience in using these materials in technical and clinical terms.

Light-cured acrylic resin is a well-established option for prosthodontic and orthodontic appliances.^[17,18]

Corll TP found the same enthusiastic in specific children from 7 to 11-year-old range for the “rainbow-colored filling” concept.^[19]

Light-cured acrylic resin is a novel alternative to both conventional and esthetic fixed space maintainers which were evaluated and used in pediatric dentistry.

Triad VLC is a colored, semi-manufactured product made of glass fibers, thermoplastic polymer, and urethane dimethacrylate light-curing resin matrix for reinforcing dental polymer.

Light-cured acrylic resin space maintainers are easy to apply, are reliable on adhesive bonding, and require only one visit. McDonald and Avery suggested that band and loops should be removed once a year to inspect, clean, and apply fluoride to the tooth. Light-cured acrylic resin seems to eliminate these annual steps.^[20]

The laboratory procedures are eliminated because they do not require casts. Although the follow-up period of these cases was short, the preliminary clinical findings encouraged reporting of light-cured acrylic resin space maintainers.

After 1-month follow-up, the appliance retained in position and the gingival show no signs of inflammation.

CONCLUSION

This case report showed that the light-cured acrylic resin space maintainers could be a new alternative to the conventional fixed space maintainers used in pediatric dentistry.

Why this paper is important for pediatric dentists?

- This case report may solve the time issue for popular band and loop space maintainer
- It also provides esthetic space maintainer
- It is chairside readily applicable space maintainer for children.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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