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Case Report

Dentistry Section

Anterior Space Maintainer Incorporating a Pontic Derived from a Strip Crown

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ABSTRACT

Various designs of functional and aesthetic space maintainers have been used in the anterior region to replace missing upper primary anteriors. All of these had utilised pontics made of composite, acrylic or natural teeth. Strip crowns have been widely used in paedodontics for restoring damaged maxillary anterior primary teeth. This case report highlights a case in which a composite resin formed tooth, derived from a strip crown, was used as a pontic in a functional and aesthetic space maintainer with the aid of Ribbond, including the various steps in its fabrication.

Keywords: Composite, Incisor, Resin, Ribbond

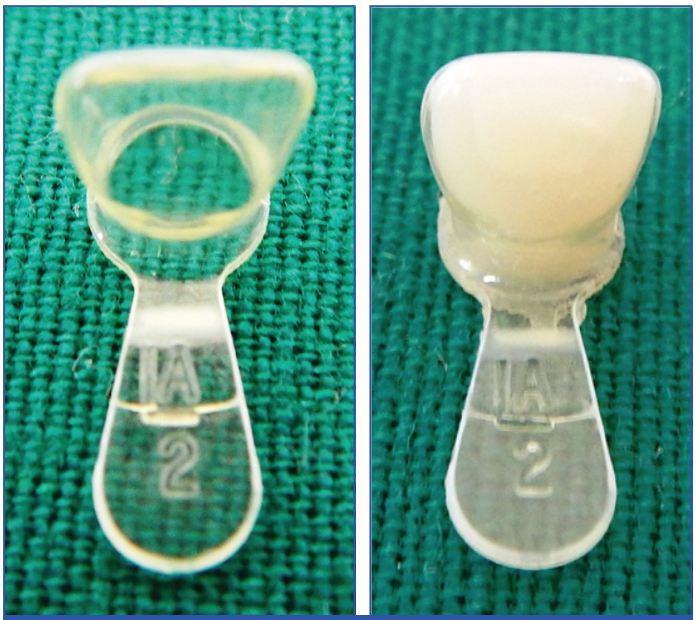
CASE REPORT

A 4-year-old child visited the paediatric dental clinic along with her parent, with the complaint of a missing upper left front tooth that had avulsed two weeks ago, due to a fall that occurred in school. Her parent revealed that she was taken to the nearest general dentist soon after the fall, and her case sheet confirmed the absence of any related fracture or medical condition.

Upon clinical examination, the upper left central incisor (61) was found to be missing, however, satisfactory healing of its socket occurred [Table/Fig-1]. All other primary teeth were present, and there was absence of any dental caries or external injury. Since, the patient wanted an aesthetic replacement for the missing tooth, it was decided to provide her with a fixed and functional anterior space maintainer.

After explaining the components, advantages and disadvantages of the space maintainer, informed consent was obtained from the father to fabricate the same. Upper and lower alginate impressions were made and casts were poured. The mesiodistal dimensions of the upper right central incisor (51) were measured, and a strip crown (corresponding to 61) that matched with the mesiodistal dimension of 51 was selected [Table/Fig-2]. Composite resin (A2 shade; Tetric® N-Ceram; Ivoclar Vivadent) was incrementally filled and condensed into the entire length of the strip crown and light cured for 60 seconds, labially and lingually [Table/Fig-3]. The strip crown was then peeled off and the composite resin formed tooth (pontic) was obtained. It was then trimmed and polished in order to match the dimensions of 51. The pontic was then adapted on to the cast using wax to verify its dimensions, and to ensure adequate overjet and overbite in relation to the lower cast [Table/Fig-4]. A strip of Ribbond (Ribbond, Inc., Seattle, WA, USA) polyethylene fiber (RPF) was cut of length equal to the distance from the distal surface of 51 till the distal surface of the left upper lateral incisor (62). The central portion of the RPF was bonded to the labial surface of the pontic using bonding agent (Adper™, Single Bond, 3M-ESPE, St. Paul, MN, USA) and light cured. A layer of composite resin was also adapted partly over the pontic and the RPF and light cured, in order to secure the pontic firmly on to the RPF. The labial surfaces of 51 and 62 were etched with 37% phosphoric acid (Total etch, Ivoclar Vivadent, Liechtenstein), following which, bonding agent was applied and cured as per manufacturer's instructions. A thin layer of composite was applied;

[Table/Fig-1]: Anterior view.



[Table/Fig-2]: Strip crown. **[Table/Fig-3]:** Strip crown filled with composite resin. (Images from left to right).

following which, the RPF containing the pontic was adapted on to the composite resin, over the labial surfaces of 51 and 62. After verifying the position of the pontic and the RPF, bonding agent was applied over the entire length of the RPF and light cured. Since, spacing (1 mm) was found between 51 and 52, the same was maintained on either side of the pontic, intraorally. Following

[Table/Fig-4]: Trial of the pontic on the cast.

[Table/Fig-5]: Space maintainer placed using Ribbond and composite.

this, composite resin was adapted on to the labial surfaces of 51 and 62, over the RPF and the tooth surfaces, and light cured [Table/Fig-5]. Excessive composite and RPF were removed and the remaining was polished using polishing burs.

DISCUSSION

Space maintenance, parental desire, restoration of function and aesthetics are the usual requirements for placing an appliance for replacing the upper anterior edentulous span [1]. In this case, the pontic received support from the edentulous arch (superiorly) and from the RPF adapted to adjacent teeth (laterally). Polyethylene fibers act as stress-bearing components by deflecting crack propagation, thereby providing composites with superior mechanical properties such as stiffness, toughness and strength [2-4]. In a crowded primary dentition, if one or more incisors are lost, there is likely to be rearrangement of space between the remaining incisors. Moreover, space maintenance is not required if anterior tooth loss occurs after the eruption of the primary maxillary canines [5]. However, in this case, spacing between 51 and 52 provided evidence of the absence of any crowding, and the primary canines were erupted. Therefore, the space maintainer placed in this case had a greater purpose of providing function and aesthetics, rather than space maintenance.

A literature search revealed that all functional space maintainers fabricated for replacing lost anterior primary teeth, utilised pontics made of either composite resin (direct build-up) without ceramic veneering [6-8], composite resin with ceramic veneering [9], prefabricated acrylic teeth [9-11] or natural teeth [12-15]. However, this is the first time that a tooth made of composite resin derived from a strip crown has been utilised as a pontic. The advantages of using this method are superior aesthetics, convenience, limited fabrication time and low costs.

Since, the child was not cooperative enough for us to carry out the bonding procedure lingually, it had to be carried out labially. This compromised the aesthetic value of the space maintainer. The natural exfoliation of 51 may get hampered, since, the pontic is bonded to both 51 and 62. Any failure in the exfoliation of 51 and the presence of the pontic, may result in ectopic eruption of both the permanent maxillary central incisors. Therefore, regular monitoring is necessary until the removal of the appliance at the time of eruption of the permanent maxillary central incisors.

It is also advisable to keep the pontic length in excess during its trial on the cast, since the pontic is expected to sink deeper into the edentulous mucosa as compared with its position on the cast. Due to this reason, the pontic in this case had resulted in an overbite of 1 mm as compared with a 2 mm overbite in relation to 51. However, this did not result in any functional implications. The child has been monitored every three months for the last two years, and no damage to the space maintainer had been found.

CONCLUSION

Strip crowns may be used to obtain artificial upper primary anterior teeth, that may be used as pontics in any fixed or removable appliances with advantages such as superior aesthetics, convenience, limited fabrication time and low costs.

REFERENCES

[1] Waggoner WF, Kupietzky A. Anterior esthetic fixed appliances for the preschooler: considerations and a technique for placement. Pediatr Dent. 2001;23(2):147-50.
[2] Rudo DN, Karbhari VM. Physical behaviors of fiber reinforcement as applied to tooth stabilization. Dent Clin North Am. 1999;43(1):07-35.
[3] Pfeiffer P, Grube L. In vitro resistance of reinforced interim fixed partial dentures. J Prosthet Dent. 2003;89(2):170-74.
[4] Gordon JE. The new science of strong materials. 2nd ed. Princeton University Press, Princeton, NJ: Harmondsworth Penguin; 1976.
[5] Ngan P, Wei SH. Management of space in the primary and mixed dentitions. In: Wei SH, editor. Pediatric Dentistry: Total patient care. Philadelphia: Lea and Febiger; 1988. pp. 462-70.
[6] Goenka P, Sarawgi A, Marwah N, Gumber P, Dutta S. Simple fixed functional space maintainer. Int J Clin Pediatr Dent. 2014;7(3):225-28.
[7] Marwaha M, Bhat M, Nanda KD. Building-up a smile in a 5-year-old child: a case report. Int J Clin Pediatr Dent. 2012;5(2):151-54.
[8] Van Wijlen P. A modified technique for direct, fibre-reinforced, resin-bonded bridges: clinical case reports. J Can Dent Assoc. 2000;66(7):367-71.
[9] Chafaie A, Portier R. Anterior fiber-reinforced composite resin bridge: a case report. Pediatr Dent. 2004;26(6):530-34.
[10] Khare V, Nayak PA, Khandelwal V, Nayak UA. Fixed functional space maintainer: novel aesthetic approach for missing maxillary primary anterior teeth. BMJ Case Rep. 2013;2013. pii: bcr2013009585.
[11] Chalakkal P, Devi RS, Srinivas GV, Venkataramana P. Fixed Dentulous Appliance to Replace Primary Upper Anterior Edentulous Span. J Clin Diagn Res. 2013;7(12):3086-87.
[12] Belli S, Ozer F. A simple method for single anterior tooth replacement. J Adhes Dent. 2000;2(1):67-70.
[13] Chauhan M. Natural tooth pontic fixed partial denture using resin composite-reinforced glass fibers. Quintessence Int. 2004;35(7):549-53.
[14] Auplish G, Darbar UR. Immediate anterior tooth replacement using fibre-reinforced composite. Dent Update. 2000;27(6):267-70.
[15] Ulusoy AT, Cehreli ZC. Provisional use of a natural tooth crown following failure of replantation: a case report. Dent Traumatol. 2008;24(1):96-99.

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