

ORIGINAL RESEARCH

# An innovative approach to chair side provisional replacement of an extracted anterior tooth with Fiber Reinforced Ribbon Composite for space maintenance

Srinivas N CH<sup>1</sup>, Jayanthi M<sup>2</sup>, Shanthan<sup>3</sup>

**Assistant Professor<sup>1&3</sup>**

Department of Pedodontics and preventive dentistry,  
Panineeya Mahavidyalaya institute of dental sciences  
and research centre,  
Hyderabad, Andhra Pradesh, India.

**Professor and head<sup>2</sup>**

Department of Pedodontics and preventive dentistry,  
Ragas dental college and hospital,  
Chennai, Tamilnadu, India.

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**ABSTRACT:**

An immediate replacement of an extracted anterior tooth may contribute to patients comfort, treatment acceptance and expectations of future treatment. However, fabrication of custom made restoration in the anterior region of the mouth through a removable or fixed may result in an esthetic compromise for patients during fabrication period. Chair side tooth replacement is an excellent short term option and one of the method is application of fiber reinforced composite resin technology. Though this method is used for reinforcing permanent tooth its use for primary teeth has not been reported. This article presents an innovative, affordable chair side procedure in which ribbon multi-purpose bondable reinforcement ribbon is used to replace a single extracted tooth using patients own tooth.

**Key words:** *fiber-reinforced composite, Space maintainer, Extracted tooth.*

When a single tooth is extracted or lost from the anterior region of the mouth in children much priorly before the eruption of permanent teeth, parents always expect immediate esthetic restoration of the edentulous spaces until the permanent tooth erupts. The restorations of choice may be an removable functional / fixed functional esthetic space maintainer. In mean time there is a healing period during which the gingival and bone architecture undergo changes associated with healing, and if the patients don't turn up for the further treatment, there are chances of space loss or patients indulging in any oral habits (Talebi R<sup>1</sup>, Bayardo RE et al<sup>2</sup>) or transient speech problems or patient may develop a

psychological problem or and last not the least patient compliance in wearing removable functional space maintainer.

Fiber reinforced composite (FRC) resin technology offers various solutions to many complex problems in restorative dentistry. The properties of FRC reins make them well suited for various chair side applications include strength, desirable esthetic characteristics, ease of use, adaptability of various shapes, and potential for direct bonding to tooth structure. Attempts at chair side tooth replacement involved the use of pontics derived from extracted permanent teeth (Antonson DE<sup>3</sup>, Ibsen RL<sup>4</sup>, Strassler HE<sup>5</sup>), acrylic resin denture teeth with or without lingual wire replacement (Davila JM<sup>6</sup>, Littman H<sup>7</sup>) and

Email for correspondence:  
cnudent@gmail.com : seenuchary@yahoo.com

resin composite (Ibsen RL<sup>4</sup>, Jensen ME<sup>8</sup> Simonsen R<sup>9</sup>, Strassler HE)<sup>10,11</sup>

All these materials have numerous limitations such as poor handling characteristics, over building, insufficient bonding, maintenance, and poor esthetic outcomes (Freilich MA<sup>12</sup>).

### Clinical report —

A 4 year old child was referred to the department of pediatric and preventive dentistry, Ragas dental college and hospital by a private practitioner for the management of loose tooth in the anterior region. On history retrieval parent reported history of trauma to upper lip after a fall injury, clinical examination revealed grade III mobile upper left central incisor and was buccally displaced. Patient reported pain due to the movement of tooth structure and on radiographic examination revealed root fracture in apical third and radiolucency around the tooth. The treatment plan was to extract the tooth and bond the crown back using FRC to adjacent teeth.

Immediately after the extraction ( fig — 4 ), the tooth was sectioned at the cemento-enamel junction; pulp was extirpated using broaches and spoon excavator. Shade A2 was used to seal the pulp chamber. Then cervical portion of tooth was contoured according to gingival margin (fig —1, 2, 3). A groove was prepared in the mid palatal section to help in retention. This intracoronal groove was a horizontal channel to accommodate the width and thickness of the FRC resin rein reinforcement material in the middle third of the tooth (Strassler HE<sup>11,13</sup>). The required length of ribbon was determined by measuring the space with dental floss before extraction. The ribbon was wet with infilled resin; care was taken to keep the ribbon away from light to prevent initial polymerization. The adjacent central and lateral incisors and extracted teeth were acid etched (37% phosphoric acid, D-Tech) and layer of bonding agent (Prime and Bond NT) was applied and light polymerized with halogen light of 500 mW/mm<sup>2</sup>

for 10 seconds. A thin layer of universal hybrid composite resin was placed on the palatal surface of adjacent teeth and extended slightly to the proximal surfaces of each tooth adjacent to the extraction area.



Fig 1: Pre — operative

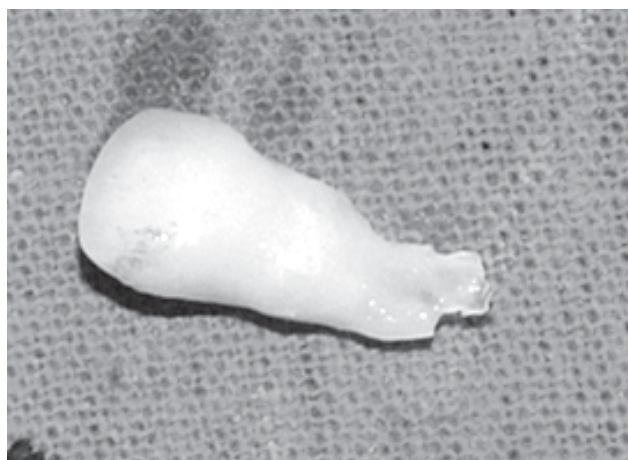


Fig 2: Extracted tooth

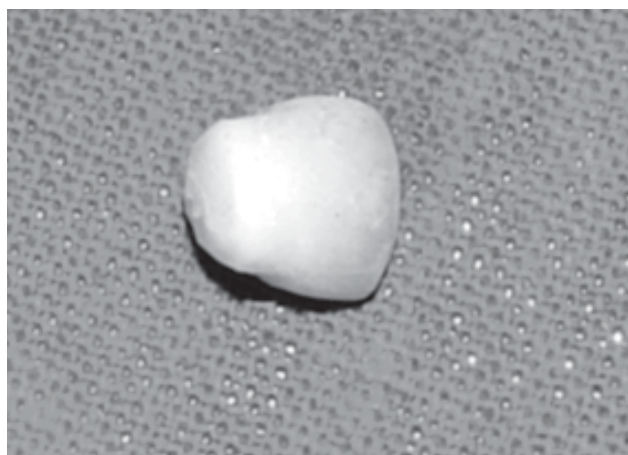


Fig 3: Cervically contoured



**Fig 4:** Occlusal view after extraction



Psychologically rehabilitated kid



**Fig 5:** Tooth bonded to adjacent teeth



**Fig 6:** Occlusal view

The wetted ribbon was pressed into the composite resin and placed on the palatal surfaces along with extracted tooth approximately and light polymerized for 40 seconds from lingual and proximal directions. Care was taken to avoid any movement during polymerization. The final step was esthetic contouring of the provisional restoration. The splint was finished and polished, lastly the child was psychologically rehabilitated at the end of the treatment.

As the fixed space maintainer was bulky and over contoured, the patient and parents were clearly informed of the importance of oral hygiene by giving attention to plaque control and traditional home care procedures. The patient was seen 1 week, 1 month, 3 months, 6 months and still being followed up every 3 months to check for the permanent tooth eruption status.

**Discussion —**

In order to replace a missing tooth following extraction we have wide range of space maintainer designs like removable, fixed, fiber reinforced composites where acrylic / composite tooth is being used. But most satisfactorily could be replacing the patients own tooth immediately after extraction. Reinforcement fibers have been shown to increase



the flexural strength and fracture toughness of composite resin restorations and thus help prevent fracture due to high stresses associated with the mastication (Valittu PK).<sup>14</sup> Since early 1990s, FRC resins are being used successfully for tooth splinting, replacement of missing teeth, reinforcing of provisional acrylic resin fixed partial dentures and orthodontic retention (Dickerson WG).<sup>15</sup>

### Conclusion

The chair side fiber reinforced composite resin space maintainer in this clinical report offers a fast, minimally invasive approach for esthetic, functional, and durable result till the permanent successors erupt.

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