

# Paediatric Prosthetic Rehabilitation using Decoronated Avulsed Teeth

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## ABSTRACT

Traumatic Dental Injury (TDI) mostly occurs as a result of any sports injury or an accident. The prognosis of teeth following injury is determined by the kind of TDI, emergency treatment, and the amount of time between emergency treatment and definitive care. Patients with missing anterior teeth lack an impressive appearance aesthetically as well as psychologically. Speech issues and some loss of function can lead to a decline in oral health, which can affect one's quality of life. This case addresses the patient aesthetic concern in anterior region of maxilla of 15-year-old male due to trauma which resulted in avulsion of both centrals and lateral incisor. Patient's own completely displaced teeth placed in biological tooth functional space maintainer was planned. The use of natural tooth as functional space maintainer method is less expensive, easy to fabricate, easy to modify according to age and produces better aesthetics. It also maintains space loss in growing children.

**Keywords:** Aesthetic, Natural tooth, Trauma

## CASE REPORT

A 15-year-old male with missing teeth in the upper front tooth area reported to the Department of Paediatric and Preventive Dentistry Rajarajeswari Dental College and Hospital [Table/Fig-1]. Patient gave a history of trauma due to fall from bicycle one and half month ago due to sudden dizziness. There was no significant past medical and family history. After contacting a local doctor, patient's mother stored lost teeth in saline.



[Table/Fig-1]: Preoperative photograph.

During clinical examination, 12, 11, 21 were missing and teeth socket was healed. The alveolar ridge was forwardly placed which may indicate increase overjet and anterior teeth were in protruded position. The mother was worried about appearance of his son she wanted a fixed teeth replacement and opted for implants and post implant restoration in the future. Implant placement should be postponed until the skeletal development process is complete. Natural teeth which had been avulsed i.e; 11, 21 had Eli's Class II fracture [Table/Fig-2]. A biological removable functional space maintainer was planned using patient's own natural teeth. Written informed consent was taken for treatment and photographs from parents.

Alginate impression was taken for both arches and diagnostic casts were made. The teeth were thoroughly scaled. An enamel bevel was prepared for 11 and 21 on labial side at 45° angle. The teeth were etched for 30 seconds with 37% phosphoric acid solution (3M ESPE Scotchbond Etchant), cleaned and dried. The bonding

agent (3M™ Adper™ Single Bond Plus) was applied and allowed to air dry for 15 seconds before light curing. The restoration was done with a small amount of Composite (Tetric N Ceram Syringe, Shade B1).

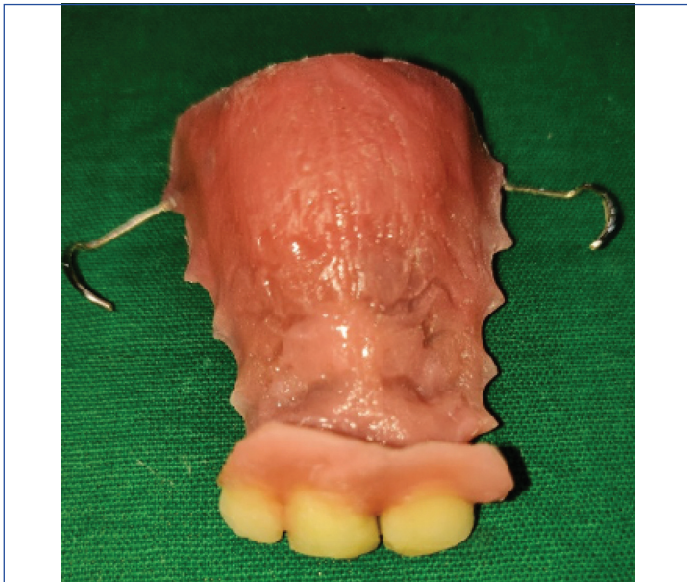


[Table/Fig-2]: Avulsed teeth.

After restoration of teeth, they were decoronated to the level of cemento-enamel junction [Table/Fig-3]. A wax pattern was designed on diagnostic cast with C-clasp on 16 and 26. Teeth were shaped at palatal cervical area for proper placement on diagnostic cast. Due to the lack of chemical bonding between the extracted natural tooth and denture base resin, the pulp chamber was enlarged and mechanical undercuts were produced on the mesial and distal surfaces of the decoronated tooth. A biological removable functional space maintainer was fabricated using heat cure acrylic resin [Table/Fig-4]. The appliance was delivered after finishing with acrylic carbide bur and polishing with wet pumice and rag wheel attached to dental lathe at low speed [Table/Fig-5,6]. Postoperative instructions were given for patient to read newspaper/books, clean it before sleeping and store space maintainer in water at night. The patient will be observed until his growth is complete, and if necessary, therapy will be given. The patient's parents were notified of an appliance concern, such as a potential fitting difficulty owing to development, and were instructed to return for appliance adjustment.



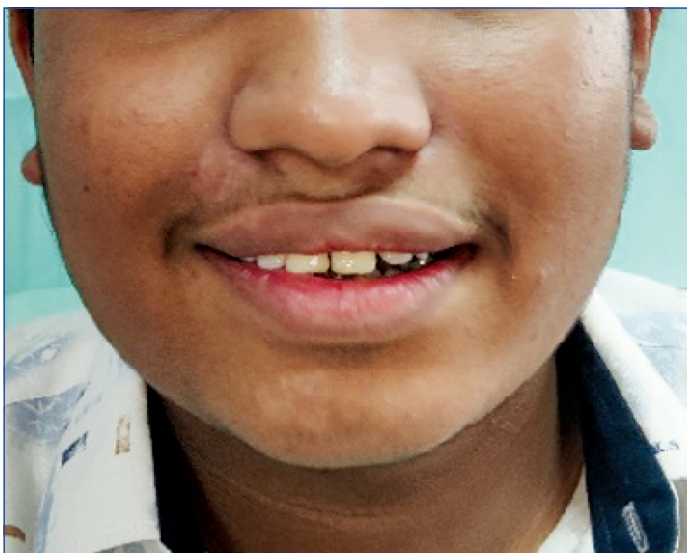
[Table/Fig-3]: Decoronated teeth.



[Table/Fig-4]: Biological removable functional space maintainer.



[Table/Fig-5]: Postinsertion of biological functional space maintainer.



[Table/Fig-6]: Postinsertion of biological functional space maintainer- extraoral image.

## DISCUSSION

The entire removal of a tooth from its socket is known as avulsion. It's a rare occurrence, with incidence rate ranging from 0.5 to 3% [1]. The maxillary central incisor is the most avulsed tooth [2]. The most typical age group affected is 7 to 9 years [3].

Missing incisors can make it difficult for a youngster to pronounce consonants like "t," "d," "n," and, in certain cases, "l." This may result in the development of abnormal speech patterns, which will need to be rectified with the help of a speech therapist when the missing teeth or abnormalities are fixed with an appropriate prosthetic device [4]. The replacement of an anterior tooth is most challenging in terms of patient's expectations, which include matching with proper shade, shape, and size as those of his/her natural teeth [5]. To restore desired anatomy and aesthetic, natural tooth either obtained from patient or from a tooth bank may be used. This procedure of using natural tooth is known as 'biological restoration'. It was coined by Santos and Bianchi, in 1991 [6].

Traumatic dental injuries are a major public health concern. These injuries can occur at any age, whether young or old, and treatment can take a long time. Adults have a frequency of roughly 33% and children have a prevalence of around 25% in permanent dentition [7]. The most common causes of tooth injuries are falls, road accidents, and sports [8]. Anatomical characteristics such as protruding upper teeth, overjet (more than 3 mm), anterior open bite, malocclusion (Class II), incompetent lips, and mouth breathing all increase the risk of dentoalveolar injury [9].

Attachment damage and pulp necrosis occur when a tooth is avulsed. Periodontal ligament tearing separates the tooth from the socket, leaving viable periodontal ligament cells on the root surface. As most avulsions occur before the patient's facial growth is complete, it is vital to preserve the tooth and surrounding bone until the patient's face growth is complete and a very simple 'permanent' restoration may be accomplished. As a result, success does not necessitate that the tooth be healthy and functional for the rest of the patient's life. In the developing patient, keeping the tooth and surrounding bone for a few years until the ultimate treatment can be regarded a success [10].

The best prognosis is for teeth replanted within five minutes after avulsion; beyond that, the health of the Periodontal Ligament (PDL) is weakened, and the PDL becomes non viable when the total extraoral dry time exceeds 60 minutes [11].

In this case as the tooth socket was already healed reimplantation was not possible. As a result, a biologically based functional space maintainer was designed. It aids in the improvement of anterior area aesthetics, as well as the prevention of improper speech and tongue habits. The use of a space maintainer appliance, or the restoration of a carious primary tooth that may then operate as a natural space maintainer, might potentially prevent arch length loss and the need for complicated orthodontic treatment later on. It also restores alveolar volume for prosthetic purposes [12]. When a kid is expected to remain without a tooth for an extended period of time, or when bone resorption and remodelling are expected soon after extraction or traumatic tooth loss, tissue supported partial dentures are recommended [5].

The use of implants in adolescents is quite different from the use of implants in adults. Because the adolescent's teeth and jaws undergo a range of changes, special attention must be paid to the child's growth [13]. If implants are inserted during active growth, they may be displaced or mispositioned by ongoing growth, requiring removal and replacement, according to Cronin et al., The best prognosis is achieved with implants put after the age of 15 for girls and 18 for guys. Implants inserted before to these ages may not be permanent and will need to be replaced [14]. Because of the unpredictability of development in the region, especially in the presence of natural teeth, the anterior maxilla is the riskiest site for early implantation. Premature implantation may demand recurrent extension of the



implant's transgingival or transmucosal portion, resulting in a poor implant-to-prosthesis ratio. Thus, implant placement should be postponed until skeletal development is complete [13].

Soft tissue impingement, interference with adjacent tooth eruption, discomfort, plaque accumulation, cavities, and broken, dislodged, or lost appliances are all potential drawbacks of utilising space maintaining appliances. Following the insertion of a space maintainer, there should be frequent follow-ups to check for any difficulties and if required redoing of same and adjust growth modification is recommended [15].

Aesthetics was also a major concern in this case as the tooth loss was in the anterior region so we planned to use the patient's own teeth which was intact for biological restoration for an interim period. The natural crowns offer outstanding anatomy and aesthetics as well as preservation of natural tooth color. When natural teeth are maintained wet, they retain their colour and vitality. When natural teeth are left to dry out, they lose their vibrant aspect and colour, but when moisture is reintroduced, these traits reappear [12]. Long-term usage of this procedure raises concerns about the brittleness and strength of the natural teeth. However, when compared to artificial teeth, the patient's own teeth provide the finest aesthetic outcomes and satisfaction.

## CONCLUSION(S)

The use of natural tooth functional space maintainer method is less expensive, easy to fabricate, easy to modify according to age and produces better aesthetics. This article highlights the use of natural teeth as functional space maintainer in growing child, as fixed prosthesis is not possible till growth completion. The use of decoronated natural tooth as functional removable space maintainer

gives better aesthetics compared to acrylic teeth and maintains the space loss for interim period.

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