



## Biological Post: A Reconstructive Approach to Achieve Aesthetics

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### Authors' contributions

This work was carried out in collaboration between all authors. Author JJ had done diagnosis & treatment planning. Author SS had assisted during treatment procedure. Author KS had helped in manuscript writing. All authors read and approved the final manuscript.

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### Case Study

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### ABSTRACT

Traumatic injuries lead to fracture of anterior teeth, frequently occurs in dentistry and the prevalence rate of fractured anterior teeth, as a result of traumatic injuries, occurs 8.1 in 1000. The fracture of a tooth is itself a traumatic incident for young patients which leads to functional, aesthetic, psychological problems and reduces patient's quality of life. Various materials are available to restore these types of traumatic injuries, but till date there is no material that has been proved to be as effective as natural structure considering mechanical and biological properties. This case report represents the management of traumatized fractured mandibular anterior teeth with biological posts and coronal restorations with composite.

*Keywords:* Trauma; biological post; monoblock.

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## 1. INTRODUCTION

Traumatic injuries lead to fracture of anterior teeth, frequently occurs in dentistry. Onetto et al. conducted a study on children and adolescents and reported that 16–30% of these individuals sustain dental trauma more than once [1-4] and the prevalence of anterior teeth fracture, as a result of traumatic injuries, occurs 8.1 in 1000 [5]. Treatment of fractured teeth due to trauma depend upon the amount of teeth structure loss. When fracture leads to loss of half or more than half of coronal tooth structure than a satisfactory option to restore these teeth by post and core technique, and various aesthetic materials such as composite and porcelain [6]. But till date there is no material that has been proved to be as effective as natural structure considering mechanical and biological properties [7]. Recently, with the advancement in the materials and bonding techniques, a new method of using a biological posts (natural extracted teeth as a post) is a feasible option for the strengthening of the root canal, because it reduces dentin stress, preserves the internal dentin walls of the root canal, biocompatible, adapts to canal configuration, favour greater tooth strength and greater retention of the posts [8]. As compared to pre manufactured posts such as metal and fiber, the biological post made of natural extracted tooth provide resilience comparable to the original tooth. It also provides excellent adhesion to the tooth structure by composite resin at a low cost [9,10].

This case report represents the management of traumatized fractured mandibular anterior teeth with biological post and coronal restoration with composite.

## 2. CASE PRESENTATION

A 10-year-old female patient was referred to the department of conservative dentistry with chief complaint of pain and fractured right and left mandibular central incisors. Her medical history was not significant & dental history revealed that the mandibular incisors got fractured due to trauma 1 year ago. The clinical examinations revealed that both fractured mandibular incisors teeth had suffered a loss of teeth structure extending upto the cervical third with an exposure of the root canals. (Fig. 1) to restore both mandibular central incisors it was planned to fabricate intraradicular biological posts which were made from the roots of extracted and properly sterilized canines and subsequently crown fabrication of mandibular central incisors

was done with composite. The patient was explained regarding the advantages and disadvantages of biological restoration as well as about other treatment options like extraction. After agreeing upon the proposed treatment, a consent form was duly signed and treatment started. First of all isolation was done with rubber dam and access opening was made with round, endoaccesss and endo Z bur (Dentsply/ Maillefer, Ballaigues, Switzerland). After preparation of straight line access, working length was determined by introducing a size 10 K-file (Dentsply/Maillefer). When the tip of the instrument penetrated and fit the apical foramen, the working length was recorded by apex locator. Biomechanical preparation was done in step back up to apical size 25. The root canals were irrigated with 1 mL of 0.5% NaOCl using an irrigating needle and dried with absorbent paper points. Dressing was done with calcium hydroxide paste. Sectional obturation of root canal was done with gutta-percha cones (Dentsply/Maillefer) and AH-26 root canal sealer. After obturation, preparation of post space in the root canals was done and the impression of post space was taken with addition silicone. After taking the impression, dental model was made with die stone.



**Fig. 1. Intraoral view showing fractured mandibular anterior teeth**

## 3. PROCEDURE FOR MAKING A BIOLOGICAL (DENTIN) POSTS

After making the positive replica of post space, the freshly extracted canine collected from department of oral surgery was autoclaved at 121°C for 15 minutes, for fabrication of biological posts. Mesiodistal and labiolingual thickness of dentin is maximum in maxillary canine in

comparison to other single rooted anterior tooth so this tooth used for fabrication of biological post. After this crown portion of canine was separated from a root by using a diamond disk and the root was sectioned mesio-distally along the long axis of the tooth. Each part of the root was cut in such a way so that it simulate the wax patterns for each canal which were obtained by molding the wax in a model. This wax pattern act as a references for orienting the shape, thickness and length of the dentin post. When intraradicular posts had been cut and suitably adapted to the dental model; they were conditioned with 37% phosphoric acid for 30 seconds, followed by the washing, drying, application of the dual core resin cement and tried on the dental stone model, which had been previously isolated, so as to facilitate the angle of insertion as well as the adaptation of these posts within the canal during (Fig. 2). After confirming the satisfactory adaptation of the

posts to the canals in the model (Fig. 3), subsequently the inner portion of the patient mandibular incisors canals were conditioned with 37% phosphoric acid for 15 seconds. Next, the bonding agent was applied and cured. The dual cured resin cement (*FluoroCore® 2* (Dentsply-caulk) was applied to the inner portion of the canals with the help of a lentulo spiral and lightly applied to the surface of the posts, which were then inserted into the canals under constant digital pressure until the end of the cement polymerization.

#### 4. OUTCOME AND FOLLOW-UP

After this post operative restoration was done with composite (Fig. 4). Patient recalled after every 3 month, in one year follow up patient was completely asymptomatic and periapical lesion got healed (Fig. 5).



Fig 2a



Fig 2b



Fig 2c



Fig 2d

**Fig. 2. Wax pattern and adapted biological post with respect to (w.r.t) 31&41**

**Fig 2a:Wax pattern with respect to (w.r.t) 31**

**Fig 2b:Wax pattern with respect to (w.r.t) 41**

**Fig 2c: Adapted biological post with respect to (w.r.t) 31**

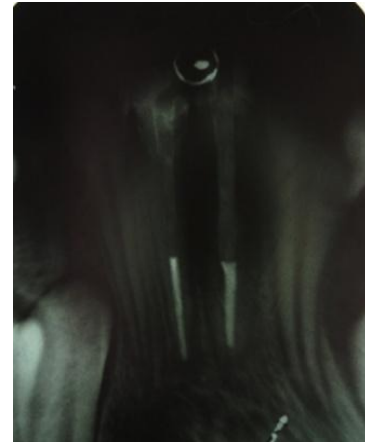
**Fig 2d: Adapted biological post with respect to (w.r.t) 41**



**Fig. 3. Adapted biological post**



**Fig. 4. Post operative intraoral view after biological post insertion & composite restoration**



**Fig. 5. Post adaptation radiograph after 1 year**

## 5. DISCUSSION

Advancement in restorative materials, application techniques and adhesive protocols made easier to restore these type of cases but these procedure are very technique sensitive, costly and also require expertise of operator. Therefore, a biological post seems to be a successful cost-effective alternative approach for treating such cases in lower economic strata. But present limitations of using the biological post such as patient may refuse to accept a tooth fragment obtained from another patient, which prevents the execution of the restoration.

This case report presents the restorations of the teeth 31 and 41 using biological posts made from natural, extracted teeth. The extracted teeth were obtained from department of oral surgery. It is important to note that, before the manipulation of any of these extracted dental teeth, they were properly cleaned, stored, and sterilized by autoclaving at 121°C for 15 minutes, ensuring all biosecurity standards [11].

Calcium hydroxide was used as a intracanal medicament in this case. Its high pH provide antibacterial property without any teeth discoloration.

In this case fabrication of wax pattern from study model was used as a reference for shaping the dentin post. Dentin posts made from roots of extracted canines were used, as they allow for a juxtaposed adaptation to the root canals and do not cause stress to the dentin, since they contain

the same biomechanical behavior as the restored teeth [12,13]. The adhesion between the “biological post,” the cementing agent, and the dental structure allows one to attain a sole biomechanical system (monoblock) with materials that are compatible among themselves [12]. The use of posts in tooth with great compromise of the dental structure allows the occlusal forces that will place pressure on the tooth to be better distributed throughout the root. Mandroli et al. also reported successful management of grossly mutilated deciduous tooth in pediatric patients using biological posts and crowns [14,15].

## 6. CONCLUSION

“Biological Posts offers excellent esthetic, functional, and psychosocial results. This justifies the use of this technique to achieve the morphofunctional recovery of extensively damaged teeth. However, further studies are needed to assess adhesion, fracture resistance, and the long-term behaviour of the posts and crowns so as to better understand the benefits of the technique and make it a more acceptable practice among dentists and patients.

## ETHICAL APPROVAL

This case was approved by institutional ethical committee.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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