

# Biological Post and Core: An Innovative Approach

Akash Bhatnagar<sup>1</sup>, Mahendra Kumar Jindal<sup>2</sup>, Saima Yunus Khan<sup>3</sup>

1-Assistant Professor, Department of Paediatric and Preventive Dentistry, Dr. Z.A Dental College and Hospital, AMU, Aligarh. 2-Professor and Chairman, Department of Paediatric and Preventive Dentistry, Dr. Z.A Dental College and Hospital, AMU, Aligarh. 3-Associate Professor, Department of Paediatric and Preventive Dentistry, Dr. Z.A Dental College and Hospital, AMU, Aligarh.

Correspondence to:  
Dr. Akash Bhatnagar, Assistant Professor,  
Department of Paediatric and Preventive Dentistry,  
Dr. Z.A Dental College and Hospital, AMU, Aligarh.  
Contact Us: www.ijohmr.com

## ABSTRACT

Anterior tooth trauma in mixed dentition period is itself a traumatic and tragic incident for children and adolescent which leads to aesthetic, functional, psychosocial problems and reduces children quality of life. Various materials and different post systems are available, but there is no material and post proved to be effective as natural teeth considering mechanical and biological properties. In this case report “Biological post” was used for the reinforcement of fractured endodontically treated maxillary central incisor. A freshly extracted human maxillary cuspid was used to prepare a dentinal post in this case and cemented with dual cure resin cement after verified into the post space. Dentinal posts are considered a good alternative to conventional post systems.

**KEYWORDS:** Anterior Tooth Trauma, Biological Post

## INTRODUCTION

Anterior tooth trauma with accompanying fracture of a permanent incisor is a bad experience for the children and creates a psychological impact on both the parents and children.<sup>1</sup> Onetto et al. reported that 16–30% of children and adolescents sustain dental trauma more than once.<sup>2</sup> The prevalence of anterior teeth fracture, as a result of traumatic dental injuries, occurs 8.1 in 1000.<sup>2</sup> Management of fractured teeth due to traumatic injuries depends upon the amount of teeth structure loss. Post and core is the only satisfactory treatment option when more than half of coronal structure loss.<sup>3,4</sup> Biological or dentinal post made of human extracted tooth provide resilience comparable to the natural tooth. It also provides good adhesion to the tooth structure by composite resin.<sup>5</sup> A biological post is a feasible option for the strengthening of the root canal, because it reduces radicular dentin stress, biocompatible, preserves the internal dentin walls, adapts to canal configuration. Biological post favor greater tooth strength and greater retention of the posts as compared to metal, glass fiber pre-manufactured posts.<sup>6,7</sup> This case report represents the management of traumatized fractured maxillary central incisor in mixed dentition period with biological post and coronal restoration with composite.

## CASE REPORT

A 10-year-old male patient reported with a chief complaint of pain and fractured right maxillary central incisors. His medical history was not significant, and dental history revealed that maxillary incisor got fractured due to trauma in road traffic accident 1 year ago. Intraoral examinations revealed that right maxillary

central incisor fractured extending up to the cervical third with an exposure of the root canal. (Figure 1) Intra oral periapical radiograph revealed that widening of periodontal ligament space on the mesial side of root. (Figure 2) To restore maxillary central incisors, it was



Fig 1: Preoperative View



Fig 2: Intraoral periapical radiograph irt 11

How to cite this article:

Bhatnagar A, Jindal MK, Khan SY. Biological Post and Core: An Innovative Approach. *Int J Oral Health Med Res* 2016;3(4):75-78.

planned to fabricate intraradicular biological or dental post and core which were made from the root of human extracted canine after properly disinfected and sterilized and subsequently crown fabrication of maxillary central incisor was done with composite. The patient's parents were explained regarding the advantages and limitations of the biological post and core as well as about other treatment options like fiber post, metal post, extraction. After taking the consent upon the proposed treatment, root canal therapy was done in maxillary right central incisor under rubber dam isolation. Sectional obturation of maxillary central incisor was done with gutta-percha cones (Dentsply/Maillefer) and AH-26 root canal sealer after complete disinfection of root canal. (Figure 3,4) After complete obturation of root canal, preparation of post space was done and then the impression of post space was taken with addition silicone. After making the impression, a positive replica of post space was made with die stone.



Fig 3: Intraoperative view after RCT irt 11



Fig 4: IOPA Radiograph irt 11 after complete obturation

Human freshly extracted canine was used for fabrication of intraradicular (Biological) post and core (Figure 5) after autoclaved at 121°C for 15 minutes. After separation of the crown portion, the root was sectioned mesio-distally along the long axis of the tooth by using a diamond disk. The sectioned root was simulated the wax pattern of the canal which was obtained by molding the wax in a model. Wax pattern acts as a reference for thickness, length and orienting the shape of the dental post. After satisfactory adaptation of the post to the canal

in the model, subsequently, the inner portion of the maxillary central incisor canal was conditioned with 37% phosphoric acid for 15 seconds. Next, wash the canal with water for 15 sec and dry the canal with paper points. The bonding agent was applied and cured. The dual-cured resin cement (*RELY X™ U200, 3M ESPE*) was applied to the inner portion of the canal with the help of a Lentulo spiral and to the surface of the dental post, which was then inserted into the canal of maxillary central incisor under constant digital pressure until the cement polymerization. (Figure 6,7) Crown fabrication was done with the composite restoration. (Figure 8)



Fig 5: Dental Post and Core



Fig 6: Cementation of Dental Post and Core



Fig 7: IOPA Radiograph after Cementation of Dental Post



Fig 8: Postoperative Composite Restoration irt 11

## DISCUSSION

Ideal coronal restoration of an endodontically treated tooth is still a challenge for restorative dentistry. Better retention and stability of coronal restoration can be achieved using posts made from different materials such as carbon fiber, fiber glass, metal and ceramic.<sup>8</sup> The ideal properties of post material should exhibit the modulus of elasticity, compressive strength, thermal expansion, and aesthetics similar to that of dentin. It should also bond predictably to root dentin. As the property of dentinal post is similar to the root dentin, so both the units flex in the same manner under stress. Biological post act as a shock absorber transmitted a very little stress to root dentinal walls.<sup>9,10</sup>

Ambica K et al. and Kathuria A et al. reported that biological posts have high fracture resistance as compared to Carbon Fibre and Glass Fibre post system in their in vitro study.<sup>6,7</sup>

Craig et al. reported that teeth restored with intraradicular solid dentinal posts exhibited higher fracture resistance than those restored with Fiber reinforced composite posts. This higher fracture resistance of biological post can be described on the basis that the Physiomechanical properties of the dentinal post are similar to radicular dentin causing uniform stress distribution.<sup>11</sup>

This case report presents the restorations of maxillary right central incisor using dentinal posts made from human extracted teeth. Before the start manipulation of human extracted teeth, they were properly cleaned with ultrasonic washing machine with enzymatic detergent and sterilized by autoclaving (Saturated steam under pressure) at 121°C for 15 minutes, ensuring all biosecurity standards.<sup>12,13</sup> Calcium hydroxide plus idoform (METAPEX) was used as an intracanal medicament in this case. Its better antibacterial property help in disinfection of root canal without any tooth discoloration.

### Advantages :

1. It does not promote radicular dentin stress.
2. It will preserve the internal radicular dentin walls of the root canal.
3. It will favour greater tooth strength and retention of these dentinal posts as compared to pre-manufactured posts.

4. It will provide excellent adhesion to the tooth structure and composite resin.
5. It will be a feasible treatment option in people of lower economic status because of lower cost.

### Disadvantages:

1. Difficulty of finding teeth.
2. Rejection to accept an extracted tooth fragment of any another patient.

## CONCLUSION

This case report presents an effective management of a fractured endodontically treated the tooth with a dentinal post. The availability of human extracted teeth would allow the biologic restorations to preserve the integrity of patient's dentition. Dentinal Posts offers excellent aesthetic, functional, and psychosocial results. However, further studies are required to assess fracture resistance, adhesion and long-term behavior of the dentinal post so as to better understand the advantages and limitations of the technique and make it a more acceptable for dentists and patients.

## REFERENCES

1. Demarco FF, Moura FR, Tarquinio SB, Lima FG. Reattachment using a fragment from an extracted tooth to treat complicated coronal fracture. *Dent Traumatol* 2008;24:257-61.
2. Onetto JE, Flores MT, Garbarino ML. Dental trauma in children and adolescents in Valparaiso, Chile. *Dent Traumatol* 1994;10:223-7.
3. Cheung W. A review of the management of endodontically treated teeth, Post, core and the final restoration. *J Am Dent Assoc* 2005;136:611-9.
4. Faria PC, Alcântara CE, Diniz MVC, Botelho AM, Tavano KT. "Biological restoration": Root canal and coronal reconstruction. *J Esthet Restor Dent* 2010;22:168-77.
5. Kinney JH, Marshall SJ, Marshall GW. The mechanical properties of human dentin: A critical review and re-evaluation of the dental literature. *Crit Rev Oral Biol Med* 2003;14:13-29.
6. Ambica K, Mahendran K, Talwar S, Verma M, Padmini G, Periasamy R. Comparative evaluation of fracture resistance under static and fatigue loading of endodontically treated teeth restored with carbon fiber posts, glass fiber posts, and an experimental dentin post system: An in vitro study. *J Endod* 2013;39:96-100.
7. Kathuria A, Kavitha M, Khetarpal S. Ex vivo fracture resistance of endodontically treated maxillary central incisors restored with fiber-reinforced composite posts and experimental dentin posts. *J Conserv Dent* 2011;14:401-5.
8. Newman MP, Yaman P, Dennison J, Rafter M, Billy E. Fracture resistance of endodontically treated teeth restored with composite posts. *J Prosthet Dent* 2003;89:360-7.
9. Mandrolí PS. Biologic restoration of primary anterior teeth: A case report. *J Indian Soc Pedo Prev Dent* 2003;21(3):95-97.
10. Kaizer OB, Bonfante G, Filho LD et al. Utilization of biological posts to reconstruct weakened roots. *Rev Gaucha Odontol* 2008;56:7-13.
11. Craig RG, Peyton FA. Elastic and mechanical properties of human dentin. *J Dent Res* 1958;37:710-8.

12. Lodayekar NV, Bhat SV, Bhat SS. Disinfection methods of extracted human teeth. J Oral Health Comm Dent 2007;27:27-9.
13. Pantera EA, Schuster GS. Sterilization of extracted human teeth. J Dent Educ 1990;54:283-5.

Source of Support: Nil  
Conflict of Interest: Nil