

CASE SERIES

FIBRE POSTS QUINT ESSENTIAL IN  
RESTORATIVE DENTISTRY – A CASE SERIES

**ABSTRACT**

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## INTRODUCTION

One of the goals of endodontic and restorative dentistry is to retain natural teeth with maximum function and pleasing aesthetics. Rehabilitation of grossly decayed teeth has been laborious in the field of dentistry.

The advent of post & core technique to restore broken down tooth has produced predictable results. The post is a restorative dental material placed in the root of a structurally damaged tooth in which additional retention is needed for the core and coronal restoration<sup>(3)</sup>.

Various methods of restoring grossly decayed teeth have been reported for more than 200 years<sup>(5)</sup>. In 1990 Duret et al described a non-metallic material for the fabrication of post based on carbon fibre reinforcement principle. Previously rigid material post used resisted lateral forces without distortion and this resulted in stress transfer to the less rigid dentin causing potential root cracking and fracture. Currently available fibre based post are essentially composite materials. They feature high tensile strength and elasticity characteristics that are similar to dentin thereby reducing the risk of root fractures caused by tension peaks induced by loading and shear stress<sup>(2)</sup>. For clinical evaluation of a severely damaged tooth, some criteria are mandatory for treatment plan<sup>(6)</sup>

**Criterion 1 - Ferrule Effect**

**Criterion 2 - Relation of Crown to Root Length**

**Criterion 3 - Endodontic Condition**

Estevas et al. - Classification of extensively damaged teeth<sup>(6)</sup>:

### Class I

Ferrule effect: Height of remaining tooth  $\geq 2$  mm at 4 locations (mesial, distal, buccal, palatine or lingual) and thickness of remaining tooth walls  $\geq 2.2$  mm for an aesthetic restoration or  $\geq 1.6$  mm for non-aesthetic restorations

Remaining root length: At least as long as the future crown height plus 5 mm for the apical seal

Endodontic condition: Endodontic treatment may be performed without predictable complications

Prognosis: Good

### Class II

**Ferrule effect:** Height of remaining tooth 0.5–2 mm or width of remaining tooth walls 1.6–2.2 mm with visible margins or 1.2–1.6 mm with non-visible margins

**Remaining root length:** Less than crown height plus 5 mm but equal or greater than crown height plus 3 mm

**Endodontic condition:** Without predictable complications or with uncertain results

**Prognosis:** Moderate

**Note:** A tooth in this class should not be used as an abutment. A new evaluation should be performed after endodontic treatment in cases where pre-treatment prognosis is uncertain.

### Class III

**Ferrule effect:** Height of remaining tooth  $< 0.5$  mm or width of remaining tooth wall

$< 1.2$  mm at future margin level

**Remaining root length:** Less than crown height plus 3 mm

**Endodontic condition:** With irreversible complications

**Prognosis:** Poor

Fibre posts provide maximal protection of the root from fracture, maximal retention of core and crown, easily retrievable, pleasing aesthetics and are less time consuming<sup>(3)</sup>.

This case report series discusses in detail about the indication of fibre post placement and role of fibre post placement in overall restorative treatment plan.

### Case reports

#### Case 1:

A 26 year old male patient reported to Department of Endodontics with the chief compliant of unaesthetic crowns in the left upper anterior tooth region and wanted to restore them. On clinical examination it was found that the crowns in relation to the left upper central incisor, lateral incisor and canine were made of self cure acrylic crowns (Figure 1). It was also found that the crown over the palatally positioned left upper canine was not in proper alignment (Figure 2). Radiographic examination

revealed metal posts in left upper central and lateral incisor which were not of sufficient length; left upper canine was intact (Figure 3). Based on Esteves et al. classification the broken down anterior teeth were designated to Class II. The remaining tooth structure of broken down anterior teeth had the following criteria,

The ferrule effect height being 2mm above gingival margin and width being 2 mm (Figure 4&5)

The root length gingival to alveolar crest being greater than crown height plus 3mm and

Endodontic condition being satisfactory.

Treatment plan involved re-restoration of left upper central and lateral incisors and also in left upper canine after intentional root canal treatment followed by post placement and composite core buildup, finally full ceramic crown for the left upper central incisor, lateral incisor and canine.

### Treatment procedure summary:

Following removal of the acrylic crowns along with the metal posts the root canal space in left upper central and lateral incisors were rechecked and confirmed radiographically that the canal space were free of any metal pieces and clear to receive a post. Root canal space were refined for post space preparation with peaso-reamer till size 3 (Figure 6). Fibre post was selected (Glass fibre posts, Produits Dentaires SA, Vevey, Switzerland) and fit tried, luted with glass ionomer cement. Core buildup was done with nano-hybrid light cure composite material (Meta-Biomed, Co., Korea) (Figure 7&8).

Left upper canine was endodontically treated. As the tooth was palatally positioned, post space was prepared labially and so the post placement in such a way that on core buildup left upper central, lateral incisors and canine were in line (Figure 9, 10&11). Crown preparation was done for ceramic crowns in left upper central and lateral incisors and canine (Figure 12&13). Ceramic crowns were luted with glass ionomer cement (Figure 14&15); patient was satisfied with the treatment outcome.

#### Case 2:

A 46 year old female patient reported to Department of Endodontics with the chief compliant of broken down anterior teeth and wanted to restore the

anterior teeth. On clinical examination, it was seen that left upper lateral incisor and right upper lateral incisor and canine were grossly decayed and broken down (Figure 1). Based on Esteves et al. classification the broken down teeth were designated to Class II. The remaining tooth structure of broken down anterior teeth had the following criteria,

The ferrule effect height being 2mm above gingival margin and width being 2 mm (Figure 1)

The root length gingival to alveolar crest being greater than crown height plus 3 mm (Figure 2) and

Endodontic condition being satisfactory (Figure 2).

Treatment plan involved root canal treatment for grossly decayed upper anterior teeth followed by fibre post placement and composite core build up, finally full ceramic crowns for all the upper anterior teeth from left upper canine to right upper canine.

### Treatment procedure summary:

Following root canal treatment for the left upper lateral incisor and right upper lateral incisor and canine, post space preparation was done using peaso-reamer till size 2 for lateral incisor and size 3 for canine. Fibre post was selected and fit was tried and luted with glass ionomer cement (Figure 3). Core build up was done using nano-hybrid light cure composite (Meta-Biomed, Co., Korea) (Figure 4). Crown preparation was done for ceramic crowns in left upper canine and lateral incisor, right upper lateral incisor and canine (Figure 5). Ceramic crowns were luted with glass ionomer cement; patient was satisfied with treatment outcome (Figure 6).

#### Case 3:

A 64 year old female patient reported to Department of Endodontics with chief complaint of broken down and missing teeth. On clinical examination, had missing right upper central incisor and left upper canine and grossly broken down left and right upper first and second premolars (Figure 7). Based on Esteves et al. classification the broken down teeth were designated as class II. The remaining tooth structure of broken down upper first and second premolars had following criteria,

The ferrule effect height being 1mm above gingival

**Case 1**

Figure 1,2. Labial and occlusal pre-operative view; improperly aligned self-cure acrylic crowns



Figure 3, 4. Labial and occlusal preoperative view after removal of acrylic crowns



Figure 5. Prepared post space

Figure 6, 7. Fiber post luted with GIC; core buildup done with nano hybrid light cure composite in left upper central and lateral incisor



Figure 8, 9, 10. Endodontically treated left upper canine; labially prepared post space; fiber post placement

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Figure 11, 12. Crown preparation – left upper central incisor, lateral incisor, canine



Figure 13, 14. Full ceramic crowns luted with GIC in left upper central incisor, lateral incisor, canine

**Case 2**

Figure 1. Labial and Occlusal Pre-operative View

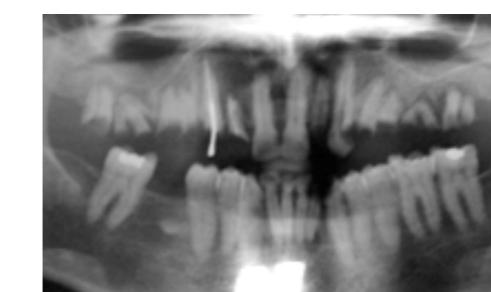


Figure 2. Radiographs showing sufficient root length and satisfactory endodontic treatment



Figure 3. Fibre post placement in right upper lateral incisor, left upper lateral incisor and canine.



Figure 4. Core build up using nano hybrid light cure composite



Figure 5. Crown preparation in left upper lateral incisor, right upper lateral incisor and canine



Figure 6. Full ceramic crowns luted in left upper lateral incisor, right upper lateral incisor and canine

**Case 3**

Figure 7. Labial and occlusal preoperative view



Figure 8. Radiograph of broken down teeth



Figure 9. Fibre post placement in right and left upper first and second premolar



Figure 10. Core build up in right and left upper first and second premolar



Figure 12. Ceramic crowns luted in right upper canine, lateral incisor, left upper central incisor and left and right first and second upper premolars

margin and width being 2 mm (Figure 7)

The root length gingival to alveolar crest being greater than crown height plus 3 mm (Figure 8) and Endodontic condition being satisfactory (Figure 8).

Treatment plan involved root canal treatment of right and left upper first and second premolar followed by fibre post placement and core build up using light cure composite. Root canal treatment of remaining teeth viz., right upper canine, lateral incisor and left upper central incisor was also done. This was followed by ceramic crown placement and replacement of missing teeth.

#### Treatment procedure summary:

Following root canal treatment of right and left upper first and second premolar teeth post space preparation was done in the palatal canal till peaso-reamer size 2. Fibre post was selected, tried into post space prepared and lute with glass ionomer cement (Figure 9). Core build up was done using nano-hybrid light cure composite (Meta-Biomed, Co., Korea) (Figure 10). Crown preparation was done in right upper canine, lateral incisor, left upper central incisor and left and right first and second upper premolars (Figure 11). Ceramic crown and bridge were luted with glass ionomer cement; patient was satisfied with treatment outcome (Figure 12).

#### DISCUSSION

In all the three cases reported in this series, fibre post placement was critical part of overall rehabilitation of a part or whole of the dentition. No longer post placement is considered for management of single tooth, it is being now extensively used as a part of rehabilitation of multiple teeth or full mouth rehabilitation as emphasized in this case report series. With post placement made easier with introduction of pre-fabricated fibre posts, a clear set of guidelines with regard to management of extensively broken down teeth becomes need of the hour. Usage of a well defined set of criteria and a sound classification based on these criteria for extensively broken down teeth requiring post placement, had greatly helped in arriving at a treatment plan with increased predictability in this case report series.

In all three cases reported here, the pre-operative tooth structure which was evaluated according to

Esteves et al. Classification<sup>(6)</sup>, did not much change after full crown tooth preparation. And in all these three cases the finish lines of tooth preparation was successfully achieved in sound tooth structure and not on the core material. Therefore pre-operative assessment of extensively damaged tooth with Esteves et al. Classification<sup>(6)</sup> and guidelines was very reliable. Increased usage and employment of classification and guidelines in management of severely broken down teeth will allow for a more standardized treatment with better predictability, and also allows further improvement of these classifications. One drawback with Esteves et al. Classification<sup>(6)</sup> is that it does not recommend which particular type of posts will better suited for each condition.

#### CONCLUSION

Esteves et al. classification provides<sup>(6)</sup> clinicians with clear guidelines in selection of a broken down tooth or teeth for post placement and rehabilitation. In future, classifications and guidelines with employment of 3-D imaging system and computer programmes could be introduced for even more accurate and predictable evaluation of the remaining tooth structure, also guidelines should be formulated with regard to type of post suitable for each clinical situation.

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