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## POSTS IN ENDODONTICS- A REVIEW

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### ABSTRACT

Restoration of teeth after endodontic treatment is an integral part of the restorative practice in dentistry. The prognosis of endodontically treated teeth depends not only on the treatment itself but also on sealing the canal and minimizing the leakage of oral fluids and bacteria into periradicular areas by prompt placement of coronal restorations. The longevity of the coronal restoration is enhanced by placing a sound infrastructure underneath it. So, Posts become the most integral part of the post endodontic restoration.

### INTRODUCTION

The restoration of endodontically treated tooth is complicated due to destruction by caries, trauma, access cavity preparation and previous restoration. The endodontically treated teeth require restoration because of dehydrated dentin, decreased structural integrity and impaired neurosensory feedback mechanism.

Post refers to a cylindrical or tapered part of post and core that fits into the prepared root canal of a tooth with coronal part called Core which gives retention to the crown and is synonymous with the term dowel or endodontic post. The primary purpose of a post is to retain a core in a tooth with extensive loss of coronal tooth structure and to provide retention to the crown.

Posts are indicated when there is very less clinical crown left and what remains does not enable sufficient retention for filling or individual fixed restoration. Posts are contraindicated in cases with abnormal root anatomy or severe curvature, root caries, cases of root resorption, incases of heavy occlusal loading and if there is less than 2 mm sound dentin coronal to the proposed crown margin. Functions of Post include providing retention, reinforcement i.e. increasing resistance of hard dental tissue against occlusal forces and restoration i.e. replacement of the lost parts of the hard dental tissue.<sup>1</sup>

#### Classification

Posts can be classified as

##### Metallic

1. Custom cast posts
2. Prefabricated

##### Non metallic

1. carbon fibre posts
2. zirconia posts
3. woven fibre composite posts

##### Metallic Posts

###### Custom-made posts

The customized cast post and core possess superior adaptation to the root canal, associated with little or no stress with installation, and high strength in comparison to the prefabricated post. On the other hand custom cast post is considered a time consuming complex procedure, less retentive than parallel-sided posts, and acts as a wedge during occlusal load transfer. They are indicated in multiple cores, small teeth and all ceramic crowns.<sup>2</sup>



### Prefabricated posts

They have ease of placement, less chair time, lower cost and the ability to restore a tooth for immediate crown preparation. On the other hand there might be excess cutting of canal dentin required to match the dimensions of the post.<sup>2</sup>

*They are of two types*

#### Active posts

They are more retentive than passive posts but introduce more stress into the root than passive posts.<sup>3,4</sup> Their use should be limited to short roots in which maximum retention is needed.<sup>5</sup>



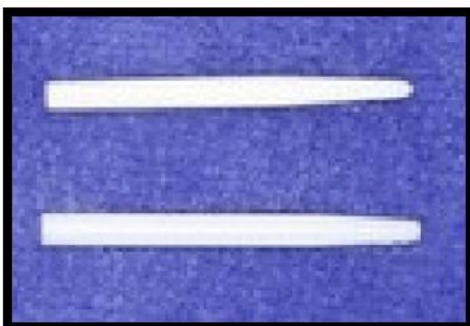
#### Passive posts

They gain retention as their name suggests by passively seating in close proximity to the post walls, and rely primarily on the luting cement for their retention.<sup>6</sup>

**Passive/Smooth Tapered Posts** - These are the ideal choice in small circular canals, teeth not subjected to high functional and parafunctional loads and in teeth with thin root walls that are perforated or have perforation repairs.



**Passive/Smooth Parallel Posts** - It provides greater retention than the tapered post. The drawbacks of this type of posts are the lack of venting (except for the ParaPost) and conservation of tooth structure.<sup>2</sup>



### Non-Metallic Post

#### Carbon fibre post

This post is made up of bundles of stretched aligned carbon fibres embedded in an epoxy matrix. It is biocompatible, non-corrosive and its placement technique is less invasive due to short post length of 7 to 8 mm with less chance of perforation. It has modulus of elasticity close to dentin and can bond to

dentin. Disadvantages include lesser strength than metallic posts, poor aesthetics due to black colour and radiolucency. According to Purton *et al.* in 1996 and Millstein *et al* 1999, bond strength of composite core material to this post is less than composite core to metal post. But this bond strength can be increased by air abrasion of CFP. Stockson *et al* in 1999 studied that retention of CFP is equal to metal post.<sup>2</sup>



#### Zirconia post

The all-zirconium posts are quite rigid, with a modulus of elasticity higher than stainless steel. It has high flexural strength, fracture toughness, radiopaque, biocompatible and with physical properties similar to steel. The disadvantages include lower fracture resistance than metal posts, difficult retrieval of the fractured post within the root canal and poor resin-bonding capabilities of the post to radicular dentin.



#### Fibre-reinforced Composite Posts

They are the most aesthetic of all posts and have similar fracture resistance as carbon fibre or stainless steel posts.<sup>2</sup>



### Factors Affecting Selection of Posts

The ideal post is approximately two thirds the length of the root, leaving 4 to 5 mm of root canal filling within the canal.<sup>2</sup> It is essential to leave adequate dentin for support and distribution of post stresses. Lloyd and Palik<sup>7</sup> summarized different approaches regarding the selection of the post diameter into 3 categories-

1. Conservationist approach - Pilo and Tamse<sup>8</sup> suggested that minimal canal preparation and maintaining as much residual dentin as possible, thereby suggesting restriction of the post diameter in an effort to conserve the remaining tooth structure,
2. Preservationist approach - the post should be surrounded by a minimum of 1mm of sound dentin
3. Proportionist approach- Stern and Hirshfeld<sup>9</sup> suggested that post width should not be greater than 1/3<sup>rd</sup> of the root width at its narrowest dimension.

The bulk of the tooth above the restorative margin should be at least 1.5 to 2 mm to achieve resistance form. For post space

preparation dentists often use mechanical preparation techniques using Gates-Glidden drills and P-type on low speed. Post is then placed in the canal and checked for the fit.<sup>2</sup>

## CONCLUSION

The number of endodontic procedures has increased steadily in the past decade with highly predictable results. Therefore, restoration of teeth after endodontic treatment is becoming an integral part of the restorative practice in dentistry.<sup>10</sup> Although many new restorative materials have become available over the past several years, some basic concepts in restoring endodontically treated teeth using posts remain the same. These include:

- Use posts with adequate strength in thin diameters
- Provide adequate post length for retention
- Maximize resistance form including an adequate ferrule
- Use posts that are retrievable.<sup>1</sup>

However, it is a clinician's operative skill that ultimately determines the quality of a restorative option. Optimal application of the clinical protocols, the attention to many fine details and, above all requirements are the key points for long-term clinical success.<sup>11</sup> The criteria and factors presented in this review may help guide the clinician in selecting the most desirable posts option for each endodontically treated tooth.

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