

## *Original Research*

### **Comparative Evaluation of Efficacy of the Cast Metal Post and the Glass Fiber Post**

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#### **ABSTRACT:**

**Background:** The primary objective of a post is to retain the coronal restoration in an endodontically treated tooth that has suffered an extensive loss of crown structure. Present study was done to evaluate comparatively the efficacy of the cast metal post and the glass fiber post. **Material and Methods:** The study was conducted on 50 root canal treated teeth and all the patients were indicated for the post and core systems. The patients of age group of 18-30 years were selected for the study. Patients with nonvital or discoloured teeth with cervical and middle third crown fracture, teeth with healthy periodontal status and occlusion with sufficient over jet and over bite, teeth with complete root formation and without any anatomic variation were included in the study. Patients' aged above 30 years with mobility of the tooth, crown fracture, and periodontal status were excluded from the study. The radiological evaluation parameters were root fracture, crown fracture, periapical status, and adaptation of the posts in the root canal. The statistical analyses were performed with SPSS statistical software (SPSS version 22.0; SPSS Inc., Chicago, IL., USA) and  $p < 0.05$  was considered statistically significant. **Results:** The results of study indicate that more number of failures was noted in patients whose teeth restored with the metal post as compared to those of the fiber post, both clinically as well as radiographically. **Conclusion:** Our study concluded that the fiber post retained crown restoration had lesser chances of failures as compared to a metal post.

**Key words:** cast metal post, glass fiber post, crown fracture.

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#### **INTRODUCTION:**

Post-core systems are widely used for the rehabilitation of teeth with endodontic treatment which incurred excessive material loss.<sup>1,2</sup> The root canal treated tooth is mostly associated with the loss of coronal and radicular tooth structure from pre-existing restorations, restorative failures, trauma, dental caries, and endodontic access preparation. When a huge amount of the clinical crown has been lost due to damage, it is often impossible to achieve the sufficient anchorage of a restoration in the remaining dentin. This hard tissue tooth structure leads to decreased occlusal load carrying capacity of the root canal treated tooth. Therefore, posts are essentially indicated for the root canal treated teeth to prevent fracture of the remaining tooth structure and to prevent tooth loss.<sup>3,4</sup> Initially, prefabricated posts were made with the metal, which sometimes visible through the structure

of endodontically treated teeth commonly in the anterior region.<sup>5</sup> More recently, glass fiber-reinforced posts are more popular because of their desirable physical properties.<sup>6</sup> Their modulus of elasticity is similar to that of dentin that results in decrease of probability of root fracture.<sup>7,8</sup> The chemical composition of glass fiber-reinforced posts is compatible with bis-GMA that is a basic resin material that is used for cementing post and reconstructing core.<sup>9</sup> Thus, the present study was done to evaluate comparatively the efficacy of the cast metal post and the glass fiber post.

#### **MATERIAL AND METHODS:**

The study was conducted among patients reporting to the OPD of Dept. of Conservative Dentistry and Endodontics, MNDV Dental College, Solan. A total of 50 root canal treated teeth of patients were selected and all the patients

were indicated for the post and core systems. The patients of age group of 18-30 years were selected for the study. After the approval from Ethical Committee of the institution, the written informed consent was obtained from all the patients involved in the study. Patients with nonvital or discoloured teeth with cervical and middle third crown fracture, teeth with healthy periodontal status and occlusion with sufficient over jet and over bite , teeth with complete root formation and without any anatomic variation were included in the study. Patient aged above 30 years with mobility of the tooth, crown fracture, and periodontal status were excluded from the study. The radiological evaluation parameters were root fracture, crown fracture, periapical status, and adaptation of the posts in the root canal. The statistical analyses were performed with SPSS statistical software (SPSS version 22.0; SPSS Inc., Chicago, IL., USA) and p<0.05 was considered statistically significant.

**RESULTS:**

The study was consisted of 50 root canal treated teeth, out of which Group I include 25 teeth treated with the metal post and Group II include 25 teeth treated with the fiber post. On the clinical evaluation, 01 patients treated with metal post showed loss of marginal integrity, 05 showed mobility of the crown, and 04 showed crown fracture, 2 patients showed periapical pathology. While none of the patients with fiber post showed loss of marginal integrity and crown fracture, periapical pathology and only 02 patient showed mobility of the crown (table 1). On the radiographical evaluation, 03 patients showed root fracture, crown fracture, and 4 patients showed improper adaptation of post in the canal in patients treated by metal post, while no failure rates were seen radiographically in patients treated by fiber post, except 02 patient showed improper adaptation of the post in the canal (table 2).

**Table 1: Clinical evaluation of the teeth**

Criteria	Group	Presence of defect	p-value
Crown fracture	Group I	4	<0.05
	Group II	0	
Marginal integrity	Group I	1	
	Group II	0	
Mobility of the crown	Group I	5	
	Group II	2	
Periodontal pathology	Group I	2	
	Group II	0	

**Table 2: Radiological evaluation of the teeth**

Criteria	Group	Presence of defect	p-value
Adaptation of the post in the canal	Group I	4	<0.05
	Group II	2	
Periapical status	Group I	1	
	Group II	0	
Root fracture	Group I	3	
	Group II	0	
Crown fracture	Group I	3	
	Group II	0	

**DISCUSSION:**

Fibre-based post systems have been the subject of a recent systematic review by Bateman et al 2003.<sup>10</sup> These posts are made of carbon, quartz or glass fibres, embedded in a matrix of epoxy or methacrylate resin. The adhesion between quartz or glass fibres and resin matrix is enhanced by fibre silanization prior to embedding.<sup>11</sup> The main advantage of these posts is that by flexing slightly under load, they distribute stresses to the root dentine in a more favorable manner than metal posts.<sup>11</sup> In our study, marginal integrity was lost in 01 patients treated with metal post and no patients treated with fiber post showed loss of marginal integrity. These results of our study were similar to the study done by Gbadebo et al., in which also 01 patient treated with metal post showed loss of marginal integrity.<sup>3</sup> On comparing the mobility of the teeth 05 patients with metal post and 02 patient with fiber post showed mobility of the crown. These results were similar to study done by Gbadebo et al in which 01 patients of metal post showed mobility of the teeth and 01 patient of fiber post showed tooth mobility.<sup>3</sup> The 04 patients of metal post showed fracture of the crown, while none of the patients treated with fiber post showed fracture of the crown. These results were in contrast to the study done by Gbadebo et al. in which no patients showed incidence of the crown fracture.<sup>3</sup> When the fracture of the tooth was evaluated radiographically, 03 patients treated with metal post and no patient with fiber post showed root fracture, while 03 patients treated with metal post showed crown fracture and none of the patient treated with fiber post showed crown fracture. Only 04 and 02 patients of the metal post and fiber post, respectively, showed improper adaptation of the post in the root canal. Thus, according to our study metal post showed more number of failures as compared to fiber post. These results were in accordance to the study by Gbadebo et al.<sup>3</sup>

Uthappa R et al showed a result from study that when the clinical evaluation was done, 02 patients treated with metal posts showed loss of marginal integrity, 03 showed mobility of the crown, and 02 showed crown fracture. While none of the patients with fiber post showed loss of marginal integrity and crown fracture, and only 01 patient showed mobility of the crown. No patients in either case showed symptoms of the periapical pathology. On the radiographical evaluation, 02 patients showed root fracture, crown fracture, and improper adaptation of post in the canal in patients treated by metal post, while no failure were seen radiographically in patients treated by fiber post, except 01 patient showed improper adaptation of the post in the canal.<sup>12</sup>

**CONCLUSION:**

Our study concluded that the fiber post retained crown restoration had lesser chances of failures as compared to a metal post.

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