

A study to compare the fracture between cast post and prefabricated threaded post

Osmani MSA¹, Sultana A², Pathan IRU³, Rahman MM⁴

Abstract:

The purpose of this study was to compare the fracture between cast post and prefabricated threaded post. A prospective study was conducted in the Department of Prosthodontics, BSMMU, Dhaka, 40 patients were selected who attended in this Department for treatment of extensively damaged natural crown of teeth as the subject of this study and divided equally in to 2 groups. In group A, 20 patients treated with dowel crown using cast post and in group-B, 20 patients treated with prefabricated threaded post. After 12 months, patients clinical sign and symptoms were recorded. A detailed clinical and radiological examination were done. Recorded data were compiled on a master sheet and statistically analyzed. Significant differences were found among two groups by fracture of tooth. 95% had no fracture in group A, and 70% had fracture in group B. From this study after assessing all findings it may be concluded that cast post is better alternative to prefabricated threaded post.

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Introduction:

Endodontically treated teeth have significantly different physical and mechanical properties compared to vital teeth. It is assumed that endodontically treated teeth are weaker and more prone to fracture because of desiccation or premature loss of moisture supplied by a vital pulp. Post have been advocated to strengthen weakened endodontically treated teeth against intra oral forces. The post distributed torquing forces within the radicular dentin to the supporting tissue along their roots.¹

When an endodontically treated tooth is prepared for a full veneer crown, substantial amount of tooth structure is lost. In order to increase its resistance and support the crown, a dowel core can be inserted. A dowel core has two parts namely a dowel and a core. The dowel is the screw

component, that is inserted into the root canal and core is the retentive component which behaves like a prepared crown for the placement of a retainer. A dowel/post provides the necessary amount of retention and acts as a substitute for the lost tooth structure.² If a substantial amount of coronal structures are missing, a cast post and core is indicated. A metal post is used which provides the necessary retention for the core. Retention of post is affected by post length, design, diameter, shape, surface texture etc. The length of the post should be 2/3 of the length of the root or 1/2 of the root. Otherwise retention will be lost & also fracture of the metal post may occur. For longevity of a dowel post affect the root fracture. Post design and ferrule effect have a direct relation to the root fracture. Studies revealed that Tapered free fabricated threaded post. Increased root fracture than cast post. The post replaces any lost coronal tooth structures of the tooth preparation. The shape of the residual coronal tooth structures combined with the core, should results in an ideal shape for the preparation.³

Cast posts are usually fabricated as tapered design for convenience of canal preparation to conform to the shape of natural root canal. For this reasons, these types of posts are more conservative of tooth structure and minimize the chance of perforation of apical root during canal preparation. Cast post core has a high strength and better adaptation with prepared surface of root so chance of micro leakage is also less than prefabricated threaded post.³

1. Dr. Md. Shibbir Ahmed Osmani, BDS, MPH, MS (Prosthodontics), OSD, DG (Health), Mohakhali, Dhaka, Deputed in BSM Medical University, Dhaka.
2. Dr. Alia Sultana, BDS, DDS, MDS (Australia), Associate Professor, Chairman, Department of Prosthodontics, Faculty of Dentistry, BSM Medical University, Dhaka.
3. Dr. Ibrahim Rahmat Ullah Pathan, BDS, MS (Prosthodontics), OSD, DG (Health), Mohakhali, Dhaka, Deputed in BSM Medical University, Dhaka.
4. Dr. Md. Mahmudur Rahman, BDS, MS (Prosthodontics), OSD, DG (Health), Mohakhali, Dhaka, Deputed in BSM Medical University, Dhaka.

Address of Correspondence: Dr. Md. Shibbir Ahmed Osmani, BDS, MPH, MS (Prosthodontics), OSD, DG (Health), Mohakhali, Dhaka, Deputed in BSM Medical University, Dhaka.

Prefabricated threaded post are made by metal, carbon fibre, ceramic and glass fibre etc. Ceramic and glass fibre provides esthetic alternatives to metal post. The prefabricated dowels are extensively used in multirooted teeth to support amalgam and composite core buildup.³ The base metal prefabricated post & core causes vertical/oblique root fracture as they electrolytic action of dissimilar metals due to lack of corrosive resistance properties.

To achieve better retention and fracture resistance of restored teeth, the cast post is preferred in damaged or broken teeth alternative to prefabricated threaded post.

Objective:

To evaluate the fracture of post and tooth by horizontal and vertical pressure.

Materials and methods:

A prospective comparative study was conducted in the Department of Prosthodontics, Faculty of Dentistry, Bangbandhu Sheikh Mujib Medical University. The total duration of study was from January 2005 to December 2006. Patients attending in the Out Patient Department of Prosthodontics of BSMMU for the treatment of extensively broken or damaged natural crown of teeth were included

in the study. The sample size was 40 and selected them by random sampling. Total 40 patients were divided into 2 groups. Group–A consisted of 20 patients and treated with dowel crown using Cast post and Group–B consisted of 20 patients and treated with dowel crown using pre fabricated threaded post.

Study procedure:

The patients were selected and evaluated by dental, medical, clinical and radiographical examination The parameter observed, studied and compared between two groups of patients under the reference of standard measure:

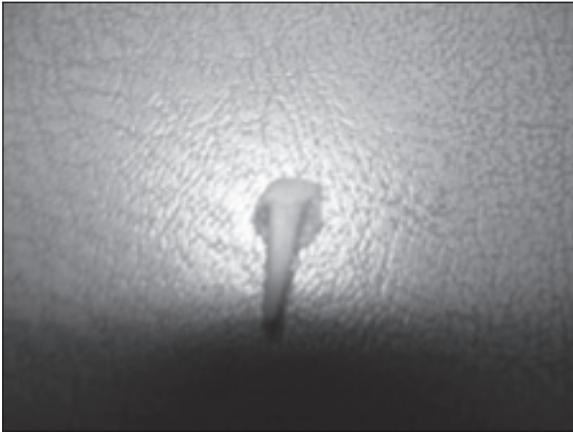
Fracture of Post and tooth evaluated by clinical and radiological examination. It is also evaluated by horizontal and vertical pressure on the margin of the crown with explorer. No movement was observed with vertical and horizontal pressure on the post core.

Results:

Results were expressed by means of table, graded and coded results, on basis of condition of prosthesis and development of diseases, were distributed in groups by number and percentages. The observed result of a table was also tested for statistical significant.

Fracture of the tooth	Group A (n=20)		Group B(n=20)		Chi-square/ p-value
	No.	%	No.	%	
After 3 months					
No fracture	20	100.0	20	100.0	
Crack only	0	0.0	0	0.0	
Break down	0	0.0	0	0.0	
Total	20	100.0	20	100.0	
After 6 months					
No fracture	20	100.0	19	95.0	
Crack only	0	0.0	1	5.0	
Break down	0	0.0	0	0.0	
Total	20	100.0	20	100.0	1.03/0.311 ^{ns}
After 12 months					
No fracture	19	95.0	15	75.0	
Crack only	1	5.0	3	15.0	
Break down	0	0.0	2	10.0	
Total	20	100.0	20	100.0	4.33/0.037*

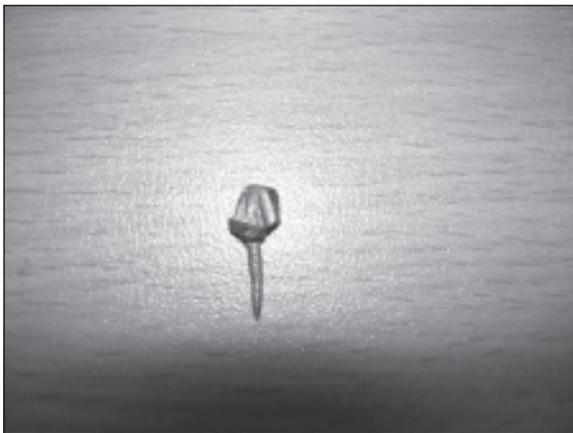
Case No. 1



Intraoral periapical



Cementation of post and core

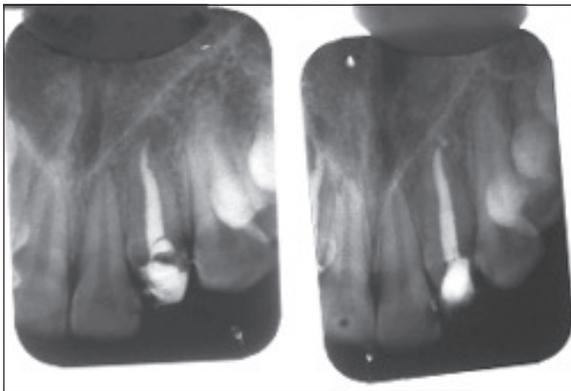


Cast metal post & core

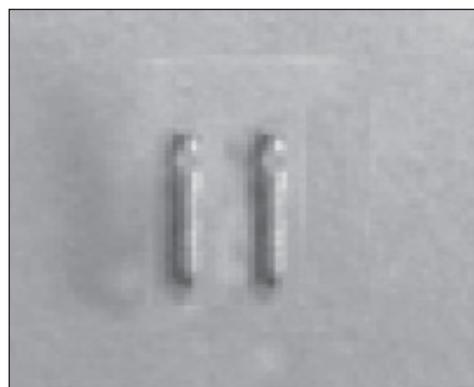


Finally cementation of crown in patient's mouth.

Case No. 2



Radiograph after root canal completion



Pre-fabricated threaded post



Cast metal crown trial



Finally cementation of crown in patient's mouth

Discussion:

Study population was divided into two groups. Total number of selected patients was 40. Two groups of patients were treated with two types of post. In group-A 20 patients were treated by dowel crown with cast post and in group-B, 20 patients were treated by prefabricated threaded post. Evaluation was done after 3 months, 6 months and 1 year. Both groups were compared in every follow-up visits according to the selected parameter. Regarding fracture criteria of tooth, in both the groups of patients (100%) had no change of the both groups, whereas after 6 months of follow up 5.0% had crack only in group-B, and the rest had no fracture of the tooth in the two groups, and on 12 months 95% had no fracture on group-A whereas 75% had fracture on group-B respectively.

Conclusion:

In this study two groups of patients were treated by dowel crown with cast post and prefabricated threaded post. The incidence of fracture of the prefabricated threaded post in higher than that of the cast post. So, it can be concluded that in endodontically treated teeth with extensively damaged natural crown, cast post is the better acceptable alternative to prefabricated threaded post.

References:

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