(e) ISSN Online: 2321-9599

(p) ISSN Print: 2348-6805

ORIGINAL ARTICLE

Assessment of the survival of fiber-reinforced, adhesively-bonded composite prostheses placed in posterior teeth- A clinical study

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ABSTRACT:

Background: The present study was conducted to assess the survival of fiber-reinforced, adhesively-bonded composite prostheses placed in posterior teeth. **Materials & Methods:** The present retrospective study was conducted on 58 patients that obtained polyethylene fiber-reinforced adhesively bonded composite resin 3-unit prostheses in posterior teeth. Patients were regularly recalled and follow up was done. **Results:** Out of 58 patients, males were 32 and females were 26. The material used was charisma and tetric. Pontic space used was upper premolar in 12, lower premolar in 10 and lower molar in 8 patients with failure rate of 2, 1 and 0 respectively. In tetric, pontic space was upper premolar in 7, lower premolar in 10 and lower molar in 15 patients. The mean survival time of charisma was 7.2 years and % of survival was 84% and in charisma was 7.6 years and 89%. **Conclusion:** Authors found mean survival time of 7.2 years and 7.6 years with survival rate of 84% and 89% of charisma and tetric ceram respectively.

Key words: charisma, FPD, tetric ceram.

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This article may be cited as: MK Saritha, K Deepak, R Eazhil, Sreedharan R. Assessment of the survival of fiber-reinforced, adhesively-bonded composite prostheses placed in posterior teeth- A clinical study. J Adv Med Dent Scie Res 2015;3(1):236-239.

INTRODUCTION

New developments in resin technology and patient demand for tooth-colored restorations led to an increased use of resin-bonded fiber-reinforced fixed partial dentures (inlay FPDs) to replace a single missing tooth, as reported in several studies.[1] The use of ultra-high molecular weight polyethylene (UHMWP) fibers is based on the improvement of the composite resin mechanical properties and behaviour.[2] This improvement depends on the fiber direction and pre-treatment. In order to reinforce the restoration in multiple directions, woven fiber and meshes have been proposed, where isotropic properties are achieved. Incorporated into composite materials, the fibers provide enhanced fracture resistance, indicating their application even when high stress is present in the oral environment.[3]

The fixed partial denture (FPD) is one of the most commonly preferred definitive treatment options for a single missing tooth.[4] For many years, FPDs were considered to be the best treatment choice for replacing a single missing tooth. Fixed prosthodontics' treatment can range from the restoration of a single tooth to the rehabilitation. Single teeth can be restored to full function, and improvement in cosmetic effect can be achieved.[5] Missing teeth can be replaced with prostheses that will improve patient comfort and masticatory efficiency, maintain the health and integrity of the dental arches. There are clinical studies reporting survival rates of posterior polyethylene fiber-reinforced FPDs showing survival rates from 55 to 86%.[6] The present study was conducted to assess the survival of fiber-reinforced, adhesively-bonded composite prostheses placed in posterior teeth.

MATERIALS & METHODS

The present retrospective study was conducted in the department of Prosthodontics. It comprised of 58 patients that obtained polyethylene fiber-reinforced adhesively bonded composite resin 3-unit prostheses in posterior teeth. All included patients were informed regarding the study and their written consent was obtained. Ethical clearance was taken before starting the study.

Data such as name, age, gender etc. was recorded. In all patients all inlay FPDs were placed in premolar and molar region using Ribbond as reinforcement and Tetric Ceram/Durafil or Charisma/Renamel composite combinations, according to manufacturer's instructions. Patients were regularly recalled and follow up was done. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 58		
Gender	**Males**	**Females**
Number	32	26

Table I, graph I shows that out of 58 patients, males were 32 and females were 26.

Graph I Distribution of patients

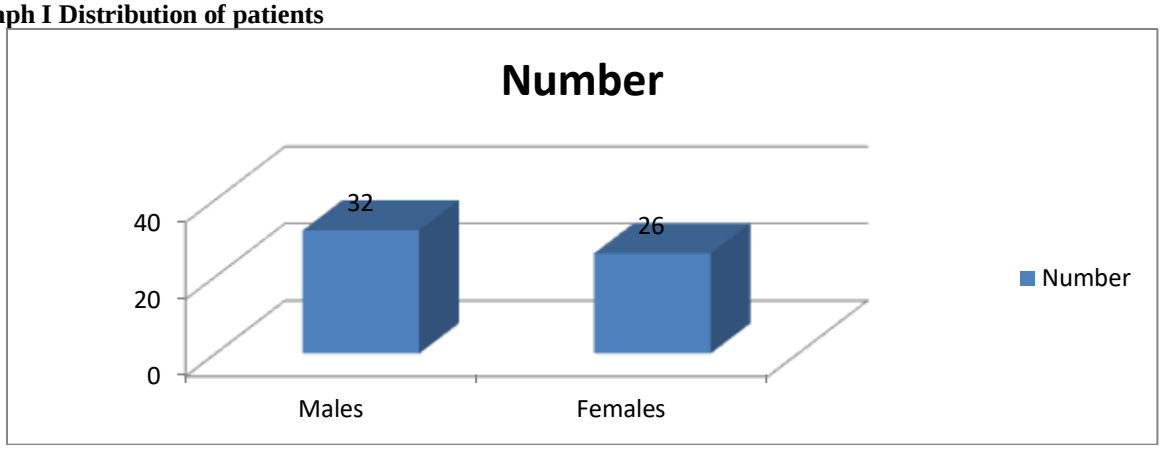

Table II Outcome of FPDs

Material	Pontic space	Number	Failure	P value
Charisma	Upper premolar	12	2	0.05
	Lower premolar	10	1	
	Lower molar	8	0	
Tetric ceram	Upper premolar	7	0	0.91
	Lower premolar	10	1	
	Lower molar	15	1	

Table II, graph II shows that material used was charisma and tetric. Pontic space used was upper premolar in 12, lower premolar in 10 and lower molar in 8 patients with failure rate of 2, 1 and 0 respectively. In tetric, pontic space was upper premolar in 7, lower premolar in 10 and lower molar in 15 patients.

Graph II Outcome of FPDs

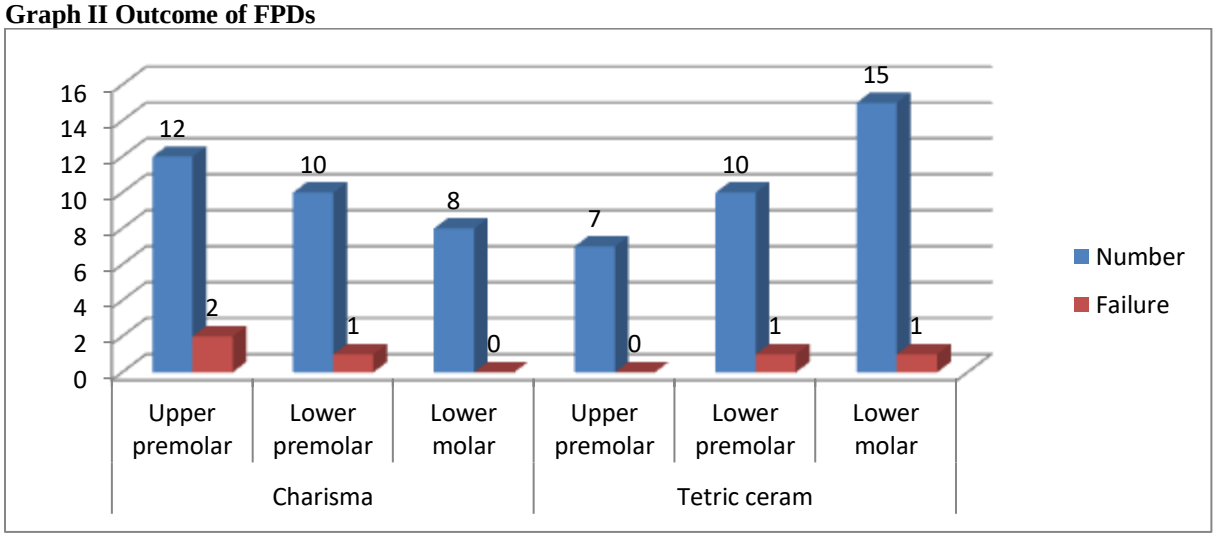

Table III Mean estimate survival rate

Material	Mean survival time (years)	% of survival
Charisma	7.2	84%
Tetric ceram	7.6	89%

Table III shows that mean survival time of charisma was 7.2 years and % of survival was 84% and in charisma was 7.6 years and 89%.

DISCUSSION

Replacement of missing teeth represents the largest category among patients in clinics who are looking for better esthetic and/or functional teeth.[7] Every restoration must not be able to withstand the occlusal forces to which it is subjected. This is to particular significance when designing and fabricating a FPD since the forces that would normally be absorbed by missing tooth are transmitted through the pontic, connectors, and retainers.[8] Abutment teeth are called on to withstand the forces normally directed to the missing plane teeth, in addition to those usually applied to the abutments. The replacement of the missing teeth in the posterior region is equally important as in the anterior segment of the mouth.[9] The present study was conducted to assess the survival of fiber-reinforced, adhesively-bonded composite prostheses placed in posterior teeth.

In present study, out of 58 patients, males were 32 and females were 26. Cenci et al[10] evaluated the long-term survival of fiber-reinforced, adhesively-bonded composite prostheses placed in posterior teeth in twenty-one patients. Of the eligible 21 patients, 13 (mean age 50.3 ± 11.5 years) agreed to be enrolled as participants, providing 22 restorations, as several subjects presented more than one inlay FPD. One dentist placed all inlay FPDs using Ribbond as reinforcement and Tetric Ceram/Durafil or Charisma/Renamel composite combinations, according to manufacturer's instructions. The majority of restorations received A or B scores. Four (18.2%) inlay FPDs fractured among the 22 evaluated. The mean estimate survival rate was 7 years (95% CI: 5.9 to 8.1), and the overall percentage of survival was 81.8%. There were no significant differences ($p>0.05$) between composite combinations or tooth location considering all clinical aspects evaluated and survival functions.

We found that material used was charisma and tetric. Pontic space used was upper premolar in 12, lower premolar in 10 and lower molar in 8 patients with failure rate of 2, 1 and 0 respectively. In tetric, pontic space was upper premolar in 7, lower premolar in 10 and lower molar in 15 patients. The mean survival time of charisma was 7.2 years and % of survival was 84% and in charisma was 7.6 years and 89%.

Fiber-reinforced partial dentures fracture strength depends on several factors including the elastic modulus of the supporting substructure, the preparation design, occlusal load of the span and the characteristics of the manufacturing and laboratory process, and the materials used to fabricate the prosthesis. The failures recorded in the present study could somewhat be attributed to cavity preparation deficiency and/or excessive occlusal load as result of a slightly larger inter-abutment distance. In addition, clinical trials have determined that larger prosthetic spaces especially in mandible are a potential risk factor for posterior inlay FPD.[11]

The reduction in sound dental structure removal, the bonding capacity - preventing microleakage and reinforcing the remnant dental structure when compared to other framework materials and the esthetics are some of the reasons for the increasing use of fiber-reinforced composite fixed partial dentures placement.[12]

The shortcoming of the study is small sample size.

CONCLUSION

Authors found mean survival time of 7.2 years and 7.6 years with survival rate of 84% and 89% of charisma and tetric ceram respectively.

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