

Original Research

Assessment of clinical performance and patient satisfaction of PEEK crowns

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ABSTRACT:

Background: The conventional restoration protocol for endodontically treated teeth with excessive coronal loss has been metal post and core followed by a complete crown. The present study was conducted to assess the clinical performance and patient satisfaction of PEEK crowns. **Materials & Methods:** 40 PEEK crowns in 40 patients of both genders were included. The crowns were examined for anatomic form, marginal integrity, surface roughness, restoration staining, marginal discoloration and color match at a time interval of 1 week, 1 month, 3 months, 6 months, one year. Patient satisfaction was also evaluated. **Results:** Out of 40 patients, males were 22 and females were 18. Anatomic forms at baseline, 3 months, 6 months and 1 year class I was 100%, 96%, 95% and 95% respectively and class II was 0, 4%, 5% and 5% respectively. Staining class I was 100%, 90%, 90% and 90% and class II was 0, 10%, 10% and 10% respectively. Periodontal status was class I seen in 100%, 86%, 80% and 65%, class II was 0, 14%, 14% and 30% and class III was 0, 0, 6% and 5%. Marginal discoloration class I was seen in 100%, 80%, 80% and 75% and class II was seen in 0, 20%, 20% and 25%. Colour match class I was seen in 100%, 100%, 100% and 90% and class II was seen in 10% at 1 year. Surface roughness class I was seen in 100%, 95%, 95% and 95% and class II was seen in 0, 5%, 5% and 5%. Marginal adaptation class I was seen in 100%, 100%, 100% and 90% and class II was 10% at 1 year. The difference was significant ($P < 0.05$). Chewing efficiency was average in 10%, good in 50% and excellent in 40%. Colour match was average in 5%, good in 30% and excellent in 65%. Comfort was average in 5%, good in 40% and excellent in 55%. Contour was average in 5%, good in 45% and excellent in 50%. The difference was significant ($P < 0.05$). **Conclusion:** The high level of accuracy of fit such as crown retention, marginal quality and marginal accuracy and aesthetic accomplished with PEEK material was deemed very satisfying.

Key words: conventional restoration, Surface roughness, PEEK crowns

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INTRODUCTION

The conventional restoration protocol for endodontically treated teeth with excessive coronal loss has been metal post and core followed by a complete crown.¹ The use of glass fiber posts combined with the dentin bonding technique made the restoration of endodontically treated teeth more straightforward, biocompatible, and economical. Initially, the post was thought to reinforce the remaining tooth structure. However, several studies have reported adequate clinical post adhesion to tooth structure, whereas others have shown variable results with high incidences of root fracture, indicating that excessive removal of tooth structure to place a post further weakens the root.²

Zirconia is one of the most promising restorative materials because it yields very favourable mechanical properties and acceptable aesthetics.³ However, failures related to both biologic complications like secondary caries and technical problems such as fracture of the bridge or chipping of the veneering ceramic have been reported. This led to the introduction of PEEK into dentistry. Materials used for prosthetic rehabilitation are always subjected to complex and changing humid and wet oral environment which is physiologically characterized by natural saliva and its components.⁴

The use of this material as layering option is beneficial to manage postoperative repairs and can be easily blended with the changes seen with time due to

dynamic occlusion. So composite layered over the PEEK copings may be effective as a viable aesthetic restoration.⁵The present study was conducted to assess the clinical performance and patient satisfaction of PEEK crowns.

MATERIALS & METHODS

The present study consisted of 40 PEEK crowns in 40 patients of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. All procedural steps were performed by the same

operator. The teeth were prepared with a chamfer finish line of 0.8 to 1 mm. The crowns fabricated were luted using resin cement. Using Modified Ryge's Criteria, the crowns were examined for anatomic form, marginal integrity, surface roughness, restoration staining, marginal discoloration and color match at a time interval of 1 week, 1 month, 3 months, 6 months, one year. Patient satisfaction was also evaluated at the same interval using a questionnaire. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

Total- 40		
Gender	Male	Female
Number	22	18

Table I shows that out of 40 patients, males were 22 and females were 18.

Table II: Assessment of parameters

Parameters	Class	Baseline	3 months	6 months	1 year	P value
Anatomic forms	I	100	96	95	95	0.02
	II	0	4	5	5	
	III	0	0	0	0	
Staining	I	100	90	90	90	0.04
	II	0	10	10	10	
	III	0	0	0	0	
	IV	0	0	0	0	
Periodontal status	I	100	86	80	65	0.05
	II	0	14	14	30	
	III	0	0	6	5	
	IV	0	0	0	0	
Marginal discoloration	I	100	80	80	75	0.01
	II	0	20	20	25	
Color match	I	100	100	100	90	0.03
	II	0	0	0	10	
Surface roughness	I	100	95	95	95	0.04
	II	0	5	5	5	
Marginal adaptation	I	100	100	100	90	0.05
	II	0	0	0	10	

Table II shows that anatomic forms at baseline, 3 months, 6 months and 1 year class I was 100%, 96%, 95% and 95% respectively and class II was 0, 4%, 5% and 5% respectively. Staining class I was 100%, 90%, 90% and 90% and class II was 0, 10%, 10% and 10% respectively. Periodontal status was class I seen in 100%, 86%, 80% and 65%, class II was 0, 14%, 14% and 30% and class III was 0, 0, 6% and 5%. Marginal discoloration class I was seen in 100%, 80%, 80% and 75% and class II was seen in 0, 20%, 20% and 25%. Color match class I was seen in 100%, 100%, 100% and 90% and class II was seen in 10% at 1 year. Surface roughness class I was seen in 100%, 95%, 95% and 95% and class II was seen in 0, 5%, 5% and 5%. Marginal adaptation class I was seen in 100%, 100%, 100% and 90% and class II was 10% at 1 year. The difference was significant (P< 0.05).

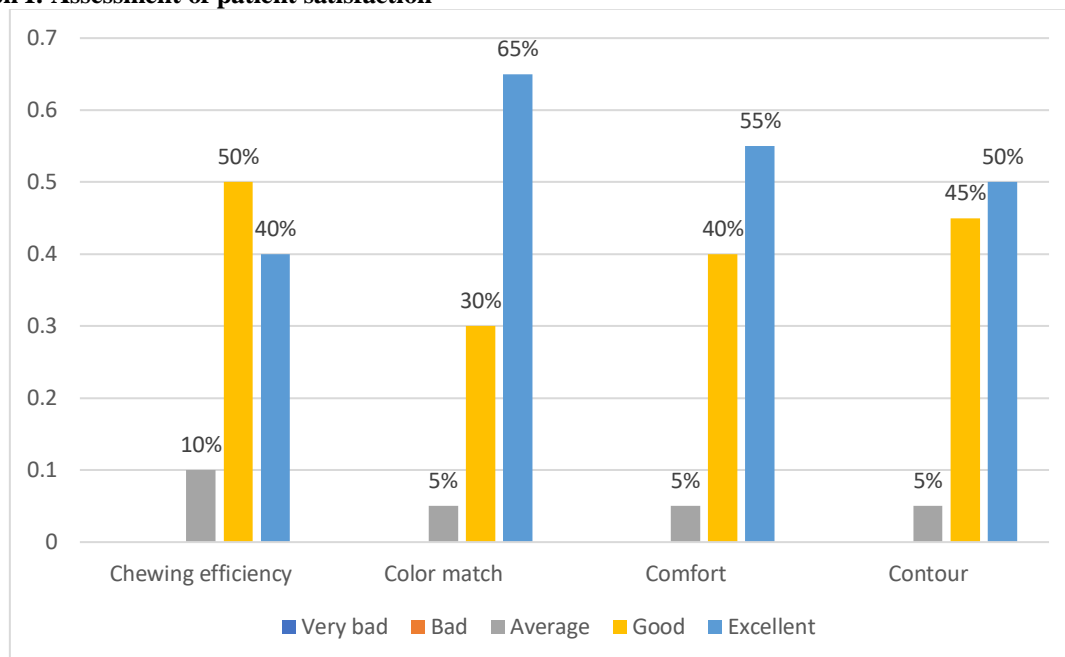
Table III: Assessment of patient satisfaction

Parameters	Very bad	Bad	Average	Good	Excellent	P value
Chewing efficiency	0	0	10%	50%	40%	0.05
Color match	0	0	5%	30%	65%	0.04
Comfort	0	0	5%	40%	55%	0.05
Contour	0	0	5%	45%	50%	0.91

Table III, graph I shows that chewing efficiency was average in 10%, good in 50% and excellent in 40%. Color match was average in 5%, good in 30% and excellent in 65%. Comfort was average in 5%, good in 40% and

excellent in 55%. Contour was average in 5%, good in 45% and excellent in 50%. The difference was significant ($P < 0.05$).

Graph I: Assessment of patient satisfaction



DISCUSSION

The advancement of porcelain fused to metal (PFM) procedures has represented PFM restorations as the “gold standard” for years together.⁶ However, in this ever-evolving field of dentistry, the growing patients’ demand for highly esthetic and natural appearing restorations has led to the development of new materials with improved mechanical characteristics providing suitable longevity.⁷ Material science has metamorphosed and seen a widespread evolution in the types of materials being used such as precious metals to all ceramic to zirconia to polyether the rke tone (PEEK).⁸ The present study was conducted to assess the clinical performance and patient satisfaction of PEEK crowns.

We found that out of 40 patients, males were 22 and females were 18. Sulaya et al⁹ evaluated the clinical performance and patient satisfaction of PEEK Crowns. Based on modified Ryge’s criteria, almost 90% of the crowns were rated satisfactory. Fracture was registered in only one crown. Slight chipping off was seen in two crowns. No significant difference was seen in any other factors assessed. Slight variation was seen in the periodontal status of 3 patients.

We found that anatomic forms at baseline, 3 months, 6 months and 1 year class I was 100%, 96%, 95% and 95% respectively and class II was 0, 4%, 5% and 5% respectively. Staining class I was 100%, 90%, 90% and 90% and class II was 0, 10%, 10% and 10% respectively. Periodontal status was class I seen in 100%, 86%, 80% and 65%, class II was 0, 14%, 14% and 30% and class III was 0, 0, 6% and 5%. Marginal discoloration class I was seen in 100%, 80%, 80% and 75% and class II was seen in 0,

20%, 20% and 25%. Color match class I was seen in 100%, 100%, 100% and 90% and class II was seen in 10% at 1 year. Surface roughness class I was seen in 100%, 95%, 95% and 95% and class II was seen in 0, 5%, 5% and 5%. Marginal adaptation class I was seen in 100%, 100%, 100% and 90% and class II was 10% at 1 year. Uhrenbacher et al¹⁰ conducted a study and after surface pre-treatment different adhesive systems were coated over the surface and they concluded that the adhesion of the tested PEEK crowns to dentin was enhanced by the use of additional adhesive systems such as visio link or Signum PEEK Bond after treatment with airborne-particle abrasion or etching with sulfuric acid. Peláez et al¹¹ evaluated zirconia crowns stated that 35% of variation in anatomic form was seen with 10% wear. This increased fracture rate may be considered because of increased recall period of 3 years. A study conducted by Taskonak and Sertgöz¹² evaluated Lithia disilicate based all ceramic crown found chipping in 10% of crowns at 1-year recall interval.

The limitation the study is small sample size.

CONCLUSION

Authors found that the high level of accuracy of fit such as crown retention, marginal quality and marginal accuracy and esthetic accomplished with PEEK material was deemed very satisfying.

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