Research Article

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Effect of Tooth Preparation on the Prevalence of Pulp Exposure During Fixed Prosthesis Fabrication

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ABSTRACT

Background: Fixed Prosthesis is one of the most popular and commonly used treatment modalities for replacement of missing teeth. The present study was conducted to investigate the prevalence of pulp exposure during tooth preparation for fixed prosthesis.

Material and Methods: The present study was conducted among 40 patients treated for fixed partial denture at the Prosthodontics Department. In the study 27 patients were female and 13 were male. The patients who received metal-ceramic FPDs or single crowns, had vital abutment teeth, and had not received any root canal treatment or filling prior to the FPD restoration were included in the study. Teeth with pre-existing restorations, non-vital teeth and teeth with very deep caries were excluded from the study. If pulpal exposure occurred, patients were referred for immediate endodontic treatment. All of the endodontic treatments were accomplished by the same clinician. Statistical analysis was done by using SPSS, version 22 (SPSS, Inc., Chicago, IL) and $p<0.05$ was considered statistically significant.

Results: The present study was conducted among 40 patients treated for fixed partial denture. The patients were divided into different age groups. Each age group contains 10 patients. The mandibular canine was the most prevalent tooth that was exposed by the tooth preparation. The age group 31-40 was the prevalent age group that was exposed by the tooth preparation.

Conclusion: Our study concluded that mandibular canines were mostly exposed during tooth preparation, therefore greater care should be taken while preparing the tooth. Patients between 31-40 years had more exposures during tooth preparation.

Keywords: Tooth preparation, prevalence, fixed Prosthesis.

INTRODUCTION

Tooth preparations must be based on primary principles for a predictable success of prosthodontic treatment. The principles of tooth preparation may be divided into the preservation of tooth structure and periodontium, retention and resistance form, marginal integrity, structural durability, and esthetic considerations. Improvement in one area often adversely affects another area, and striving for one may lead to failure in another. Careful attention to every detail is imperative during tooth preparation.[1] Fixed prosthodontic treatment can range from the restoration of a single tooth to the rehabilitation of the entire occlusion. Conventional complete crown coverage[2] and fixed partial dentures have recently come into extensive use for both their aesthetic and mechanical properties, which include durability[3] and reliability.[4,5] Each

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step in the fabrication of a fixed prosthesis is a potential source of insult to the pulp.[6,7] Unquestionable threats to pulpal integrity exist during the construction of fixed prosthetic restorations.[8] Thus, the present study was conducted to investigate the prevalence of pulp exposure during tooth preparation for fixed prosthesis.

MATERIAL AND METHODS

The present study was conducted among 40 patients treated for fixed partial denture at the Prosthodontics Department. In the study 27 patients were female and 13 were male. Before the commencement of study informed consent was signed by the participants. The patients who received metal-ceramic FPDs or single crowns, had vital abutment teeth, and had not received any root canal treatment or filling prior to the FPD restoration were included in the study. Preoperative periapical radiographs were obtained, and all abutment teeth were evaluated prior to tooth preparation. Teeth with pre-existing restorations, non-vital teeth and teeth with very deep caries were excluded from the study. Teeth were prepared using diamond burs in a high speed hand piece under air and water coolant. If pulpal exposure occurred, patients were referred for immediate endodontic treatment. All of the endodontic treatments were accomplished by the same clinician. Statistical analysis was done by using SPSS, version 22 (SPSS, Inc., Chicago, IL) and $p<0.05$ was considered statistically significant.

RESULTS

The present study was conducted among 40 patients treated for fixed partial denture. The patients were divided into different age groups. The mandibular canine was the more prevalent tooth that was exposed by the tooth preparation. The age group 31-40 was the prevalent age group that was exposed by the tooth preparation.

Table 1: Prevalence of pulp exposure according to tooth.

Tooth Number	No. of persons with pulp exposure
Maxillary central incisor	5
Maxillary lateral incisor	3
Maxillary canine	3
Maxillary 1ST premolar	4
Maxillary 2nd premolar	1
Maxillary 1st molar	0
Maxillary 2nd molar	0
Maxillary 3rd molar	0
Mandibular central incisor	3
Mandibular lateral incisor	5
Mandibular canine	6
Mandibular 1ST premolar	2
Mandibular 2nd premolar	5
Mandibular 1st molar	2
Mandibular 2nd molar	1
Mandibular 3rd molar	0

Table 2: Prevalence of pulp exposure according to age group.

Age group	No. of persons with pulp exposure	p-value
21-30 (n=10)	8	<0.05
31-40(n=10)	14	
41-50(n=10)	12	
51-60(n=10)	6	

DISCUSSION

Fixed prosthodontic treatment involves the replacement and restoration of teeth by artificial substitutes that are not readily removable from the mouth by the patient and serve to restore function, esthetics and comfort. When fixed partial dentures are used to replace missing single tooth especially in young patients most of the time the abutment teeth are vital. Fabrication of fixed partial denture usually requires preparation of these vital teeth. Postoperative sensitivity after cementation of fixed prosthesis is a common complaint especially in cases where the abutments have vital pulp.[9] The results of our study shows that the mandibular canine was the more prevalent tooth that was exposed by the tooth preparation. The age group 31-40 was the prevalent age group that was exposed by the tooth preparation. Gumus HO et al, conducted a study and showed result that pulpal

exposure occurred in 80 teeth, Chi-square demonstrated no difference ($P > 0.05$) male-female exposure ratio (1:1.5). The difference in exposure between maxillary and mandibular teeth was statistically significant ($P < 0.05$). Only 28.75% of exposed tooth was malposed. The majority ($n = 49$, 61.25%) of exposures occurred in mandibular teeth and this was statistically significant ($P < 0.05$). Overall the most frequently exposed tooth was mandibular canine (20%), followed by the maxillary central incisor (13.75%) and mandibular lateral incisor (10%).[10] Al-Khreisat evaluated the incidence of endodontic treatment required for vital abutment teeth during tooth preparation or immediately after the completion of the prosthetic treatment and found a rate of 0.7 percent.[11]

CONCLUSION

Our study concluded that mandibular canines were mostly exposed during tooth preparation therefore greater care should be taken while preparing the tooth. The majority of patients in which pulpal exposure occurred during tooth preparation were between 31-40 years of age.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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