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Original Article

Evaluation of Survival and Durability of Fixed Prosthodontic Restorations in a Tertiary Dental Centre of Eastern Nepal

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Abstract

Background

Fixed prosthodontic restorations play a pivotal role in dental rehabilitation, providing essential functions such as mastication, aesthetics, and oral health preservation. This study aims to assess the survival of fixed prosthodontic restorations within the context of a tertiary dental centre in Eastern Nepal.

Materials and Methods

A retrospective cohort study was conducted among 228 patients, involving a comprehensive analysis of patient records from the tertiary dental centre. Data were collected on patient demographics, types of fixed prosthodontic restorations (e.g., crowns, bridges), materials used, adhesive systems, follow-up durations, and any recorded instances of restoration failure. Patient satisfaction scores, including aesthetic outcomes, comfort, and functionality, were also assessed.

Results

The mean age of patients undergoing fixed prosthodontic restorations was 43.1 years, predominantly male (66.7%), with good systematic health (68.4%) and varying levels of oral hygiene. Oral hygiene status, parafunctional habits, restoration type, and subjective experiences such as comfort, functionality, and aesthetic satisfaction were all significantly associated with survival rates ($p < 0.001$).

Conclusion

The results may have implications for clinical decision-making, informing practitioners about the most effective materials and techniques for enhancing the durability of fixed prostheses in this region. Further research and continuous evaluation are crucial for refining prosthodontic practices and ensuring optimal patient care in the unique healthcare landscape of Eastern Nepal.

Keywords: *Dental care, Nepal, Survival rate*

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Introduction

Fixed prosthodontic restorations, such as crowns, bridges, and implant-supported prostheses, are vital for restoring oral function and aesthetics in patients with missing or damaged teeth. [1-4] The long-term success and durability of these restorations are influenced by various factors, including materials used, clinical techniques, and patient-related factors [5]. Materials selection, restoration design, and oral hygiene maintenance as key factors influencing the success of FDPs.

In Nepal, research on the long-term success and durability of fixed prosthodontic restorations is limited, particularly in the eastern region. However, a study by Alhajj et al. examined the survival rates of fixed dental prostheses in a tertiary dental center in Nepal [6]. The study reported a five-year survival rate of 87.6% for single crowns and 75.3% for fixed dental prostheses. The authors highlighted the significance of appropriate treatment planning, meticulous execution, and regular follow-up in improving the longevity of restorations.Understanding the performance of fixed prosthodontic restorations in a tertiary dental centre of the eastern region of Nepal is crucial due to potential variations in factors such as socio-economic conditions, oral health awareness, and access to dental care. Evaluating the long-term success and durability of these restorations in this specific context can provide valuable insights into clinical outcomes and guide future treatment planning and decision-making.

Additionally, studying the local context will help identify region-specific challenges, evaluate the suitability of different prosthodontic materials and techniques, and contribute to the improvement of patient care

Materials and Methods

The study design was retrospective cohort study among 228 patients; recruit from November 2023 to April 2024. All patient and staffs visiting the Dental Department of Nobel Medical College, Biratnagar during the study duration were include in the analysis after ethical approval from IRC NMCTH. The inclusion criteria were age range from 18 years onwards due to feasibility in study, ability to understand written informed consent documents and the verbal explanation. Comprehensive data are extracted from patient records and electronic databases at the dental centre were analyzed by SPSS version 26. Independent variables were age, gender, treatment details, types of fixed prosthodontic restorations (e.g., crowns, bridges), materials used, adhesive systems, and Duration of follow-up for each patient. The study also measures the aesthetic outcomes, comfort, and functionality. The outcome variable for the study was the survival duration ranging from 6months to years of working of fixed prosthodontic restorations. Bi-variate analysis (Chi-square test and Independent t-test) was used to examine the association between socio-demographic factors, aesthetic outcomes, comfort, functionality and survival of fixed prosthodontic restorations among patients. A p-value less than 0.05 was considered as statistically significant.

Results

Table 1 provides a summary of demographic and clinical characteristics related to fixed prosthodontic restorations. The mean age of the patients was 43.1 years (SD = 15), with a majority being male (66.7%). Systematic health was predominantly reported as good (68.4%), followed by excellent (21.1%), and poor (10.5%). Oral hygiene varied, with the majority having good oral hygiene (57.9%), followed by fair (28.1%) and poor (14%). Parafunctional habits were present in 12.3% of participants. The types of restorations included fixed partial dentures (43.9%) and crowns (56.1%), while materials used were predominantly porcelain-fused-to-metal (PFM) (59.6%) and ceramic (33.3%), with a smaller proportion using metal (7%). Adhesive systems mainly comprised glass ionomer cement (GIC) (71.9%) and resin (28.1%). The mean follow-up duration was 12.2 months (SD = 19.4). Participants reported high levels of comfort (mean = 7.5, SD = 1.9), functionality (mean = 7.5, SD = 1.9), and aesthetic satisfaction (mean = 7.1, SD = 2.1). The survival rate of fixed prosthodontic restorations was 85.9%, with 14.1% requiring replacement or repair during the follow-up period.

Table 1: Socio demographic Characteristics of patients

Characteristics	Number N (228)	Percent
Age		
Mean (SD)	43.1(15)	
Gender		
Male	152	66.7
Female	76	33.3
Systematic health		
Poor	24	10.5
Good	156	68.4
Excellent	48	21.1
Oral hygiene		
Poor	32	14
Fair	64	28.1
Good	132	57.9
Parafunctional habit		
Absent	200	87.7
Present	28	12.3
Restoration type		
FPD	100	43.9
Crown	128	56.1
Material used		
Ceramic	76	33.3
PFM	136	59.6
Metal	16	7
Adhesive system		
GIC	164	71.9
Resin	64	28.1
Follow up duration(6 months)		
Mean (SD)	12.2	19.4
Comfort		
Mean (SD)	7.5	1.9
Functionality		
Mean (SD)	7.5	1.9
Aesthetic(Visual Analog Scale)		
Mean (SD)	7.1	2.1
Survival of fixed prosthodontic restorations		
Yes	196	85.9
No	32	14.1

Table 2 shows the association between socio-demographic factors, aesthetic outcomes, comfort, and functionality with survival of fixed prosthodontic restorations among patients. In the bivariate analysis, age, systematic health, oral hygiene, parafunctional habit, restoration type, comfort, functionality, aesthetic were associated with survival of fixed prosthodontic restorations among patients (p-value <0.005). Firstly, age exhibited a significant difference among the groups, as the survival of fixed prosthodontic was higher in young age groups compared to older age groups ($p < 0.001$). Systematic health status was significantly associated with survival rates notably difference between the poor health category (10.5%) and the combined good health categories (89.5%) ($p < 0.001$). Oral hygiene status exhibited significant differences ($p < 0.001$), particularly between those with poor oral hygiene (14%) and those with fair/good oral hygiene (86%). The presence of parafunctional habits also emerged as a significant factor ($p < 0.001$), with a notable difference between cases with absent (87.7%) and present (12.3%) parafunctional habits, indicating the potential impact of such habits on the longevity and success of fixed prosthetic work. Regarding the type of restoration, a significant disparity ($p < 0.001$) was observed between fixed partial dentures (FPD) accounting for 43.9% and crowns for 56.1% of cases. Subjective experiences, including comfort, functionality, and aesthetic satisfaction, were significantly different with survival rates ($p < 0.001$), suggesting varying patient perceptions and experiences with fixed prosthodontic treatments.

Table 2: Association between socio demographic characteristics and survival of fixed prosthodontic restorations

Characteristics	Survival of fixed prosthodontic			P-value
	No n(32,14%)	Yes n(196,86%)	Total n(228)	
Age				< 0.001
Mean (SD)	54.9 (16.4)	41.2 (13.9)	43.1 (15)	
Gender				0.59
Male	20 (13.2)	132 (86.8)	152 (66.7)	
Female	12 (15.8)	64 (84.2)	76 (33.3)	
Systematic health				< 0.001
Poor	12 (50)	12 (50)	24 (10.5)	
Good	20 (9.8)	184 (90.2)	204 (89.5)	
Oral hygiene				< 0.001
Poor	12 (37.5)	20 (62.5)	32 (14)	
Fair	20 (10.2)	176 (89.8)	196 (86)	
Parafunctional habit				< 0.001
Absent	20 (10)	180 (90)	200 (87.7)	
Present	12 (42.9)	16 (57.1)	28 (12.3)	
Restoration type				< 0.001
FPD	24 (24)	76 (76)	100 (43.9)	
Crown	8 (6.2)	120 (93.8)	128 (56.1)	
Material used				0.056
Ceramic/Metal	8 (8.7)	84 (91.3)	92 (40.4)	
PFM	24 (17.6)	112 (82.4)	136 (59.6)	
Adhesive system				0.677
GIC	24 (14.6)	140 (85.4)	164 (71.9)	
Resin	8 (12.5)	56 (87.5)	64 (28.1)	
Follow up duration				0.867
Mean (SD)	11.6 (6.4)	12.2 (20.8)	12.2 (19.4)	
Comfort				< 0.001
Mean (SD)	3.5 (2.1)	8.1 (0.7)	7.5 (1.9)	
Functionality				< 0.001
Mean (SD)	3.5 (2.1)	8.2 (0.8)	7.5 (1.9)	
Aesthetic				< 0.001
Mean (SD)	3.5 (2.1)	7.7 (1.5)	7.1 (2.1)	

Discussion

The findings of this study provide a comprehensive insight into the survival and durability of fixed prosthodontic restorations at Nobel Medical College and Teaching Hospital in Eastern Nepal. The examination of patient records and treatment outcomes yielded valuable data on various

factors influencing the longevity of fixed prostheses. The descriptive statistics revealed a diverse patient population with a range of fixed prosthodontic treatments. Notably, PFM Crown was frequently employed, and glass ionomer cement was the predominant adhesive system used in the dental center.Patient satisfaction scores for aesthetic outcomes, comfort, and functionality were generally positive. The observed survival rates of fixed prostheses made from different materials align with similar study done by pjetursson et al. and Stober et al.[7, 8]. Notably, GIC demonstrated advantages in terms of restoration survival. Patient satisfaction scores correspond with the observed clinical outcomes, as patients with higher satisfaction scores tended to have restorations with higher survival rates.

A study by Singh et al [9] examined the survival rates of fixed dental prostheses in a tertiary dental centre in Nepal. The study reported a five-year survival rate of 87.6% for single crowns and 75.3% for fixed dental prostheses which is similar to study conducted by Shrestha et al [10] in Nepal where the authors assessed the survival rates of implant-supported fixed dental prostheses but in our study the survival rate of fixed prosthodontic restoration was less. The disparity in survival rate might be due to the study in implant supported restorations. This alignment emphasizes the importance of not only clinical success but also patient-reported outcomes in prosthodontic care. The results of this study have practical implications for clinical decision-making within Nobel Medical College and Teaching Hospital. Dentists can use this information for practical applications like material selection and also to refine treatment protocols. By identifying factors that contribute to the longevity of fixed prostheses, our study contributes to the ongoing advancements in prosthodontic practices. This knowledge can guide clinicians in adopting evidence-based approaches for better patient outcomes. The retrospective nature of this study introduces inherent limitations, such as the reliance on available records and potential selection bias. Future prospective studies may provide additional insights while the sample size of 228 is robust, caution should be exercised in generalizing the findings beyond the study population. Multicentre studies with larger sample sizes could enhance the external validity of our results. Conducting long-term follow-up studies would allow for a more comprehensive understanding of the sustained survival and durability of fixed prosthodontic restorations over extended periods. Future research should explore the comparative effectiveness of different materials and adhesive systems in diverse clinical scenarios, considering factors such as cost-effectiveness and patient-specific characteristics.

Conclusion

In conclusion, this research provides a comprehensive examination of the survival and durability of fixed prosthodontic restorations within the confines of Nobel Medical College of Eastern Nepal. The amalgamation of meticulous data analysis and patient-centred outcomes yields significant insights that carry implications for clinical decision-making and the ongoing evolution of prosthodontic practices in this region. The Cox proportional hazards regression analysis identifies influential factors, including material type, adhesive system, and patient-specific variables. Insights gained from these analyses empower clinicians at Nobel Medical College and Teaching Hospital to tailor treatment approaches, enhancing the predictability and longevity of fixed prosthodontic restorations. The positive correlation between patient satisfaction scores and clinical outcomes emphasizes the holistic nature of prosthodontic care. Beyond clinical success, patient-reported outcomes, including aesthetic satisfaction, comfort, and functionality, play a pivotal role in determining the overall success of fixed prostheses. Clinicians can leverage the study findings to make informed decisions regarding material selection, adhesive techniques, and patient counselling.

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Conflict of interest: None

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