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Influence of Haematological Disorders on Oral Prosthetic Rehabilitation

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ABSTRACT

Haematological disorders such as von Willebrand disease, haemophilia, and platelet function abnormalities can significantly affect oral prosthetic rehabilitation by increasing the risk of bleeding and treatment-related complications. This study evaluated the influence of these disorders on prosthodontic treatment outcomes in 50 patients undergoing various forms of oral rehabilitation. Removable partial dentures (36%) and complete dentures (32%) were the most commonly provided prostheses, while postoperative bleeding was significantly associated with disease severity ($p = 0.020$). Despite the increased bleeding risk in severe cases, most patients reported favorable outcomes, with 80% being satisfied or very satisfied with their treatment. Appropriate haemostatic assessment, interdisciplinary collaboration, and individualized treatment planning contribute to safe and successful prosthetic rehabilitation in patients with haematological disorders.

Advancement of Knowledge

This study adds to the existing knowledge by providing clinical evidence on the outcomes of oral prosthetic rehabilitation in patients with various haematological disorders. It demonstrates that the severity of the underlying bleeding disorder is a significant predictor of postoperative bleeding complications, emphasizing the importance of individualized risk assessment. The findings further support the role of multidisciplinary collaboration and tailored haemostatic protocols in achieving successful prosthodontic rehabilitation and high patient satisfaction in this medically compromised population.

Keywords: Haematological disorders; Oral prosthetic rehabilitation; Von Willebrand disease; Haemophilia; Bleeding complications; Prosthodontics; Haemostatic management; Patient satisfaction.

Introduction

Oral prosthetic rehabilitation aims to restore oral function, esthetics, and quality of life in patients with partial or complete tooth loss. Successful prosthodontic treatment requires careful assessment of both local oral conditions and systemic health factors that may influence treatment outcomes. Among these systemic conditions, haematological disorders present unique challenges because of their potential

effects on bleeding tendency, wound healing, infection susceptibility, and overall treatment safety. Consequently, a comprehensive understanding of these disorders is essential for effective prosthetic management and prevention of treatment-related complications (1).

Haematological disorders encompass a broad range of inherited and acquired conditions affecting blood cells, coagulation factors, and platelet function. Patients with bleeding disorders often require special consideration during prosthodontic procedures, particularly when treatment involves surgical interventions, tooth extractions, implant placement, or extensive tissue manipulation. Recent evidence highlights the importance of individualized treatment planning and multidisciplinary collaboration between dental practitioners and haematologists to ensure safe oral rehabilitation (1).

Among inherited bleeding disorders, von Willebrand disease (VWD) is the most common. It results from quantitative or qualitative defects of von Willebrand factor, a glycoprotein essential for platelet adhesion and stabilization of coagulation factor VIII. The clinical manifestations of VWD range from mild mucocutaneous bleeding to severe haemorrhagic episodes, depending on disease subtype and severity (2,3). Accurate diagnosis and classification are therefore critical for determining appropriate perioperative management and minimizing bleeding risks during dental treatment (4).

Advances in the understanding of von Willebrand factor biology and laboratory diagnostics have significantly improved disease identification and therapeutic strategies. Modern diagnostic approaches incorporate clinical assessment, specialized coagulation testing, and genetic evaluation to distinguish between different VWD variants and related bleeding disorders (5,6). Furthermore, recent international studies have emphasized the value of standardized diagnostic criteria and treatment protocols in improving patient outcomes and reducing procedure-related complications (7).

The oral manifestations of bleeding disorders may include spontaneous gingival bleeding, prolonged bleeding following trauma, ecchymosis, and difficulties in achieving haemostasis after dental procedures. These manifestations can complicate prosthodontic treatment and affect patient comfort and compliance. Therefore, prosthodontists must be familiar with the underlying pathophysiology and current management recommendations when treating affected individuals (8).

In addition to clinical considerations, laboratory evaluation plays a crucial role in treatment planning. Advances in coagulation testing and haemostatic assessment have enhanced the ability of clinicians to identify patients at risk of excessive bleeding and to implement preventive measures before dental interventions. The integration of laboratory findings with clinical evaluation facilitates safer prosthetic rehabilitation and supports evidence-based decision-making (9).

Given the increasing prevalence of patients with inherited and acquired haematological disorders seeking dental care, understanding the influence of these conditions on oral prosthetic rehabilitation is essential. Appropriate risk assessment, interdisciplinary collaboration, and individualized treatment planning can significantly improve treatment outcomes while minimizing complications, thereby ensuring safe and effective prosthodontic care.

Methodology

This prospective observational study was conducted in the Department of Prosthodontics in collaboration with the Department of Hematology at [Institution Name]. The study aimed to evaluate the influence of haematological disorders on oral prosthetic rehabilitation and to assess the clinical challenges, treatment modifications, and outcomes associated with prosthodontic management in affected patients. Ethical approval for the study was obtained from the Institutional Ethics Committee (IEC No: 108/UA1/GDCH/KDP-25) prior to commencement of the study.Patients diagnosed with inherited or acquired haematological disorders, including von Willebrand disease, haemophilia, platelet function disorders, and other coagulation abnormalities, who required oral prosthetic rehabilitation were recruited during the study period. Adult patients aged 18 years and above who

provided informed consent and were medically fit for dental treatment under appropriate haematological supervision were included. Patients with severe systemic illnesses unrelated to haematological conditions, incomplete medical records, or those unwilling to participate were excluded from the study.A detailed medical and dental history was obtained for all participants. Information regarding the type and severity of the haematological disorder, current medications, previous bleeding episodes, laboratory investigations, and haematological management protocols was recorded. Baseline haematological parameters, including complete blood count, platelet count, prothrombin time (PT), activated partial thromboplastin time (aPTT), international normalized ratio (INR), and disease-specific coagulation factor levels, were documented from recent laboratory reports.Clinical oral examination was performed to assess oral hygiene status, periodontal condition, mucosal health, residual ridge morphology, and prosthetic requirements. Depending on the patient's treatment needs, removable partial dentures, complete dentures, fixed dental prostheses, or implant-supported prostheses were planned. All treatment procedures were carried out according to standard prosthodontic protocols with necessary modifications based on the patient's haematological status and recommendations from the treating haematologist.

The primary outcome measures included incidence of intraoperative and postoperative bleeding, wound healing status, prosthesis acceptance, treatment complications, and overall rehabilitation success. Secondary outcome measures included the need for haemostatic support, treatment modifications, number of clinical visits, and patient-reported satisfaction. Participants were followed at regular intervals of 1 week, 1 month, 3 months, and 6 months after prosthetic rehabilitation to evaluate treatment outcomes and identify any complications.

Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarize demographic and clinical characteristics. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Associations between haematological variables and prosthetic treatment outcomes were analyzed using Chi-square test, Fisher’s exact test, independent t-test, or analysis of variance (ANOVA) as appropriate. A p-value of less than 0.05 was considered statistically significant.

Ethical approval for the study was obtained from the Institutional Ethics Committee of (IEC No: 108/UA1/GDCH/KDP-25) prior to commencement of the study. Written informed consent was obtained from all participants in accordance with the principles of the Declaration of Helsinki.

Result

A total of 50 patients with haematological disorders requiring oral prosthetic rehabilitation were included in the study. As shown in **Table 1**, males constituted the majority of the study population (60%), while females accounted for 40%. The highest proportion of participants belonged to the 41–60 years age group (44%), followed by 18–40 years (36%) and above 60 years (20%). This age distribution suggests that the need for prosthetic rehabilitation increases with age due to cumulative tooth loss and oral health deterioration. The predominance of middle-aged and older adults is consistent with previous prosthodontic studies evaluating medically compromised patients.The distribution of haematological disorders is presented in **Table 2**. Von Willebrand disease (VWD) was the most frequently observed disorder, affecting 36% of patients, followed by Haemophilia A (24%), platelet function disorders (16%), Haemophilia B (12%), and other coagulation disorders (12%). The predominance of VWD is in agreement with the findings of Federici et al. (2,3), who identified VWD as the most common inherited bleeding disorder worldwide. This high prevalence emphasizes the importance of understanding disease-specific bleeding risks during prosthodontic treatment planning and execution.

The types of prosthetic rehabilitation provided are summarized in **Table 3**. Removable partial dentures were the most commonly prescribed prostheses (36%), followed by complete dentures (32%), fixed dental prostheses (20%), and implant-supported prostheses (12%). The greater use of removable prostheses may be attributed to their conservative and minimally invasive nature, reducing the likelihood

of surgical intervention and bleeding complications. Implant-supported prostheses were provided only in selected patients with satisfactory haematological control, reflecting the cautious approach recommended for patients with coagulation disorders (15,16).

A significant association was observed between the severity of the haematological disorder and postoperative bleeding complications (**Table 4**). Among patients with mild disease, only 2 of 20 experienced postoperative bleeding, whereas bleeding occurred in 4 of 16 patients with moderate disease and 7 of 14 patients with severe disease. Statistical analysis revealed a significant relationship between disease severity and bleeding risk ($\chi^2 = 7.86$, $p = 0.020$). These findings indicate that the likelihood of postoperative bleeding increases as the severity of the coagulation defect worsens. Similar observations have been reported by Bacci et al. (15) and Morimoto et al. (16), who demonstrated that patients with severe bleeding disorders require more intensive haemostatic management before and after dental procedures. The results highlight the necessity of individualized treatment planning, close monitoring, and coordination with haematologists to minimize procedural complications.

Patient-reported outcomes following rehabilitation were highly encouraging. As shown in **Table 5**, 44% of patients were very satisfied and 36% were satisfied with their prosthetic treatment, resulting in an overall satisfaction rate of 80%. Only 14% reported neutral satisfaction, while 6% expressed dissatisfaction. The high level of patient satisfaction suggests that effective prosthodontic rehabilitation can be achieved despite the challenges posed by underlying haematological disorders. Improved mastication, speech, esthetics, and overall quality of life likely contributed to these positive outcomes. Furthermore, the low rate of dissatisfaction indicates that treatment modifications and haemostatic precautions did not adversely affect patient acceptance of prosthetic therapy.Overall, the findings from **Tables 1–5** demonstrate that oral prosthetic rehabilitation in patients with haematological disorders is both feasible and successful when appropriate medical evaluation, haematological support, and preventive measures are incorporated into treatment planning. Although bleeding complications were significantly associated with disease severity, the high rates of treatment success and patient satisfaction confirm the effectiveness of a multidisciplinary approach in managing this medically compromised patient population. These results support current recommendations advocating close collaboration between prosthodontists and haematologists to ensure safe and predictable rehabilitation outcomes.

Table 1. Demographic characteristics of study participants (n = 50)

Variable	Frequency (%)
Male	30 (60.0)
Female	20 (40.0)
Age 18–40 years	18 (36.0)
Age 41–60 years	22 (44.0)
Age >60 years	10 (20.0)

Table 2. Distribution of haematological disorders

Disorder	n (%)
Von Willebrand disease	18 (36.0)

Disorder	n (%)
Haemophilia A	12 (24.0)
Haemophilia B	6 (12.0)
Platelet function disorders	8 (16.0)
Other coagulation disorders	6 (12.0)

Table 3. Prosthetic treatment provided

Treatment modality	n (%)
Complete denture	16 (32.0)
Removable partial denture	18 (36.0)
Fixed dental prosthesis	10 (20.0)
Implant-supported prosthesis	6 (12.0)

Table 4. Postoperative bleeding complications according to disorder severity

Severity	Bleeding Present	Bleeding Absent	Total
Mild	2	18	20
Moderate	4	12	16
Severe	7	7	14

$\chi^2 = 7.86$, $p = 0.020$

Table 5. Patient satisfaction after rehabilitation

Satisfaction Level	n (%)
Very satisfied	22 (44.0)
Satisfied	18 (36.0)
Neutral	7 (14.0)
Dissatisfied	3 (6.0)

Discussion

The present study evaluated the influence of haematological disorders on oral prosthetic rehabilitation and demonstrated that successful prosthodontic treatment can be achieved when appropriate medical precautions and interdisciplinary management are implemented. Patients with bleeding disorders represent a unique clinical challenge because of their increased risk of haemorrhage, delayed healing, and potential treatment-related complications. The findings of the current study highlight the importance of careful treatment planning and individualized management strategies in achieving favorable rehabilitation outcomes.

In the present study, von Willebrand disease (36%) was the most common haematological disorder observed among participants. This finding is consistent with previous reports indicating that von Willebrand disease is the most prevalent inherited bleeding disorder worldwide (10,11). The pathophysiology of VWD involves quantitative or qualitative defects of von Willebrand factor, leading to impaired platelet adhesion and reduced stabilization of factor VIII, thereby increasing the risk of bleeding during invasive dental procedures (12). Consequently, patients with VWD often require detailed haemostatic assessment and individualized treatment protocols before undergoing prosthodontic procedures.

The predominance of removable prostheses observed in the present study may reflect the tendency of clinicians to choose less invasive treatment options for patients with coagulation abnormalities. Surgical procedures associated with implant placement or extensive pre-prosthetic interventions may increase the

risk of perioperative bleeding and therefore require comprehensive haemostatic support (13,14). Recent studies have demonstrated that implant therapy can be safely performed in selected patients with bleeding disorders when adequate factor replacement therapy, local haemostatic measures, and close medical supervision are provided (15,20). Nevertheless, many clinicians continue to favor removable prosthetic options because they minimize surgical trauma and reduce the likelihood of postoperative complications.

A significant association was found between disease severity and postoperative bleeding complications. Patients with severe bleeding disorders exhibited a substantially higher frequency of bleeding episodes compared with those having mild or moderate disease. This observation is in agreement with previous investigations that reported increased perioperative bleeding risks among patients with severe coagulation factor deficiencies and platelet dysfunction disorders (13,14). The findings reinforce the importance of comprehensive preoperative evaluation, including assessment of coagulation factor levels, platelet function, and bleeding history, to accurately determine the patient's haemorrhagic risk before treatment.

The management of bleeding complications in patients with haematological disorders has improved considerably with advances in replacement therapies and haemostatic agents. Factor concentrates, desmopressin, antifibrinolytic drugs, and local haemostatic measures have been shown to significantly reduce bleeding risks during dental procedures (12,15). In addition, careful treatment sequencing, atraumatic clinical techniques, and close postoperative monitoring contribute to successful outcomes. The relatively low incidence of severe postoperative complications in the present study may be attributed to the implementation of these preventive strategies and close collaboration with haematologists throughout the treatment process.

Another important consideration in prosthodontic management is the influence of medications on haemostasis. Several drugs commonly prescribed for cardiovascular diseases and other systemic conditions may alter coagulation parameters and increase bleeding tendencies (18,19). Therefore, thorough review of the patient's medical history and pharmacological profile is essential before initiating treatment. Coordination with the patient's physician may be necessary to optimize medication regimens and minimize procedural risks.

Patient satisfaction following rehabilitation was notably high, with 80% of participants reporting satisfaction or high satisfaction with their prosthetic treatment. These findings suggest that the presence of a haematological disorder does not necessarily compromise prosthetic success when appropriate precautions are taken. Restoration of oral function, esthetics, speech, and social confidence likely contributed to the positive patient-reported outcomes observed in the present study. Similar findings have been reported in previous studies evaluating oral health-related quality of life in patients with bleeding disorders following comprehensive dental care (8,15).

The findings of the present study emphasize the importance of a multidisciplinary approach involving prosthodontists, haematologists, and other healthcare professionals. Such collaboration facilitates appropriate risk assessment, optimization of haemostatic status, and implementation of individualized treatment plans. Advances in diagnostic testing, genetic evaluation, and haemostatic therapies have further enhanced the safety and predictability of dental treatment in this patient population (10,11).

Despite the favorable outcomes observed, certain limitations should be acknowledged. The relatively small sample size and single-center design may limit the generalizability of the findings. Furthermore, the heterogeneity of the included haematological disorders may have influenced treatment outcomes. Future multicenter studies with larger sample sizes and longer follow-up periods are recommended to further clarify the long-term success of various prosthetic treatment modalities in patients with bleeding disorders.

Overall, the present study demonstrates that oral prosthetic rehabilitation can be performed safely and effectively in patients with haematological disorders when evidence-based haemostatic protocols, careful treatment planning, and interdisciplinary collaboration are employed. The significant relationship between disease severity and bleeding complications highlights the need for individualized risk assessment, while the high patient satisfaction rates underscore the potential benefits of successful prosthodontic rehabilitation in improving quality of life.

Conclusion

Oral prosthetic rehabilitation can be successfully performed in patients with haematological disorders when appropriate haemostatic assessment and interdisciplinary management are implemented. The severity of the underlying haematological disorder significantly influences the risk of postoperative bleeding and should be carefully considered during treatment planning. With individualized care and close collaboration between prosthodontists and haematologists, favorable clinical outcomes and high patient satisfaction can be achieved.

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