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Comprehensive oral rehabilitation in a patient with diabetes mellitus: a surgical, periodontal, and prosthetic approach for the recovery of masticatory function and the prevention of malnutrition

Rehabilitación oral integral en un paciente con diabetes mellitus: enfoque quirúrgico, periodontal y protésico para la recuperación de la función masticatoria y la prevención de la desnutrición

Reabilitação oral integral em um paciente com diabetes mellitus: abordagem cirúrgica, periodontal e protética para a recuperação da função mastigatória e prevenção da desnutrição

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ABSTRACT

This case report highlights the dental rehabilitation of a patient with controlled diabetes mellitus, emphasizing the importance of oral health for their overall well-being. The treatment included periodontal therapy, fixed and removable prostheses, and precision attachments to restore esthetics and masticatory function. Significant improvements were achieved in oral health, function, and quality of life, along with the stabilization of periodontal health after five months of follow-up. It highlights the role of adequate masticatory function in the prevention of malnutrition, especially in diabetic patients, where poorly controlled oral health can exacerbate systemic conditions. An interdisciplinary approach is essential to address both functional and esthetic needs, improving oral and systemic health outcomes in diabetic patients.

Keywords: removable partial denture; oral rehabilitation; partially edentulous arch; fixed partial denture; case report.

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RESUMEN

El presente reporte de caso resalta la rehabilitación dental de un paciente con diabetes mellitus controlada, enfatizando la importancia de la salud bucal para su bienestar general. El tratamiento incluyó terapia periodontal, prótesis fijas y removibles, y aditamentos de precisión para restaurar la estética y la función masticatoria. Se lograron mejoras significativas en la salud bucal, la función y la calidad de vida, junto con la estabilización de la salud periodontal después de cinco meses de seguimiento. Se destaca el papel de una función masticatoria adecuada en la prevención de la desnutrición, especialmente en pacientes diabéticos, donde una salud bucal mal controlada puede agravar las condiciones sistémicas. Un enfoque interdisciplinario es fundamental para abordar tanto las necesidades funcionales como estéticas, mejorando los resultados de salud bucal y sistémica en pacientes diabéticos.

Palabras clave: dentadura parcial removible; rehabilitación bucal; arcada parcialmente edéntula; dentadura parcial fija; reporte de caso.

RESUMO

O presente relato de caso destaca a reabilitação dentária de um paciente com diabetes mellitus controlada, enfatizando a importância da saúde bucal para seu bem-estar geral. O tratamento incluiu terapia periodontal, próteses fixas e removíveis e aditamentos de precisão para restaurar a estética e a função mastigatória. Evidenciou-se melhora na saúde bucal, função e qualidade de vida, juntamente com a estabilização da saúde periodontal após cinco meses de acompanhamento. Destaca-se o papel de uma função mastigatória adequada na prevenção da desnutrição, especialmente em pacientes diabéticos, nos quais uma saúde bucal mal controlada pode agravar as condições sistêmicas. Uma abordagem interdisciplinar é fundamental para atender às necessidades funcionais e estéticas, melhorando os resultados de saúde bucal e sistêmica em pacientes diabéticos.

Palavras-chave: prótese parcial removível; reabilitação bucal; arcada parcialmente edêntula; prótese parcial fixa; relato de caso.

INTRODUCTION

Tooth loss and occlusal problems significantly affect chewing ability and nutritional status, especially in patients with diabetes mellitus (DM). For these individuals, maintaining proper oral function is essential for overall health, as reduced chewing efficiency can impact nutrition. Prosthodontists and other oral health professionals play a crucial role in restoring function and quality of life for these patients through oral rehabilitation. Treatment options for patients with DM and tooth loss range from fixed crowns to partial or complete dentures supported by natural teeth or dental implants. Replacing missing teeth not only improves chewing and nutrition but also has a positive impact on physical health (1).

In recent years, removable prostheses with precision attachments have become a highly beneficial option in oral rehabilitation, particularly in cases requiring both aesthetics and functionality. Precision attachments consist of two interlocking metal components that form a secure yet smooth connection. The first component, the matrix, is a small metal groove integrated into a cast restoration, while the second component, the patrix, is attached to the removable partial denture (RPD). These attachments eliminate the need for traditional clasps, occlusal rests, and retention arms, resulting in a more aesthetic and simplified partial denture (2).

Precision attachments improve retention, durability, and comfort, allowing prostheses to not only appear natural but also preserve oral health by reducing stress on the remaining teeth (2). Clinicians trained in the use of precision attachments can expand their treatment repertoire and offer patients a more attractive, functional, and health-conscious option for dental replacement, making these advanced prostheses particularly valuable for patients with specific needs, such as those with diabetes.

The loss of masticatory function can lead to changes in food selection, with individuals often opting for softer, carbohydrate-rich foods (3). This dietary shift

can disrupt nutritional balance and negatively impact glycemic control, which is particularly concerning for patients with DM. Poor glycemic control can, in turn, exacerbate systemic conditions and further deteriorate overall health. Restoring masticatory function is crucial in improving both dietary habits and metabolic stability in these patients (4). The objective of the present case report was to restore aesthetics, masticatory function, and periodontal health in a diabetic patient through comprehensive prosthetic and periodontal treatment.

CASE PRESENTATION

A 61-year-old female patient visited the Dental Specialties Clinic at the Universidad Internacional del Ecuador (Quito, Ecuador) in May 2023 to replace her fixed prostheses. Her main concern was aesthetics. She reported that her prostheses had been in place for 12 years, with no dental check-ups during that time. The patient had a history of controlled type 2 DM, confirmed by her physician and a blood test indicating a baseline glucose level of 95 mg/dL. After signing the informed consent, comprehensive dental care was initiated.

The intraoral examination revealed maladapted upper tooth-supported fixed prostheses (abutments 1.7, 1.4, 1.2, 2.2, 2.3, and 2.5) with evident deterioration and marginal leakage, leading to biofilm accumulation at the margins. The gingiva around the abutment teeth showed signs of biofilm-induced inflammation. In the lower arch, teeth 4.3 and 3.2 had over-contoured restorations that also caused inflammation. Teeth 4.7, 3.6, and 3.8 presented with carious lesions. Tooth 3.8 had migrated mesially due to the chronic absence of tooth 3.7, which had been extracted previously. Photograph and radiographic studies of the patient can be found on Figure 1.

Radiographic studies included a panoramic X-ray and multiple periapical radiographs, focusing on teeth requiring endodontic treatment. Radiographic examination revealed a radiopaque element within the root canal of tooth 2.2 compromising its integrity and associated with a radiolucent area indicative of periapical pathology. The carious lesion on tooth 4.6 was found to be near the pulp chamber. Additionally, tooth 2.7 displayed evidence of prior root canal treatment (Figure 1). The patient's oral diagnosis was partial edentulism in both the upper and lower arches due to tooth loss from extractions, accompanied by biofilm-induced gingival alterations, enamel caries in teeth 3.5, 3.6, and 3.8, symptomatic irreversible pulpitis in teeth 1.4, 1.7, 2.3, 2.5, and 4.6, fractures in teeth 1.2 and 2.2, and a retained root for tooth 1.8, which lacked an antagonist and therefore no longer served a functional purpose.

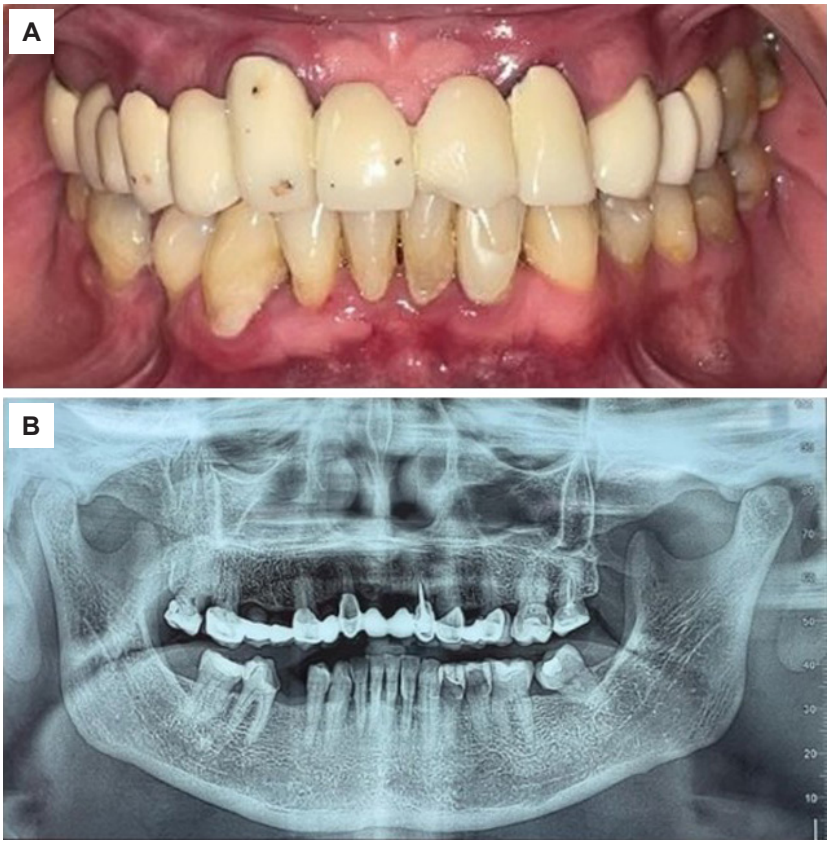

Figure 1. Patients condition before treatment. A) Frontal intraoral photograph showing deteriorated dental prostheses and gingival erythema at the margins. B) Initial panoramic radiograph.

After presenting the patient with three treatment options, a mixed prosthesis with precision attachments for the upper arch was selected, along with replacement of the lower restorations with carious lesions. To achieve the therapeutic goal of oral rehabilitation for the upper arch, a combination of periodontal, endodontic, and oral surgery interventions was performed as needed. Treatment began with periodontal prophylaxis, followed by the extraction of teeth 1.2, 2.2, and 1.8 over the subsequent months while simultaneously continuing endodontic treatments and the patient's rehabilitation process. During the treatment period, a digitally designed 3D-printed provisional prosthesis was used for the upper arch. The comprehensive treatment lasted approximately 13 months in the university clinic, allowing enough time to carry out necessary interventions and educate the patient on oral hygiene and physiotherapy habits to ensure treatment success (Figure 2).

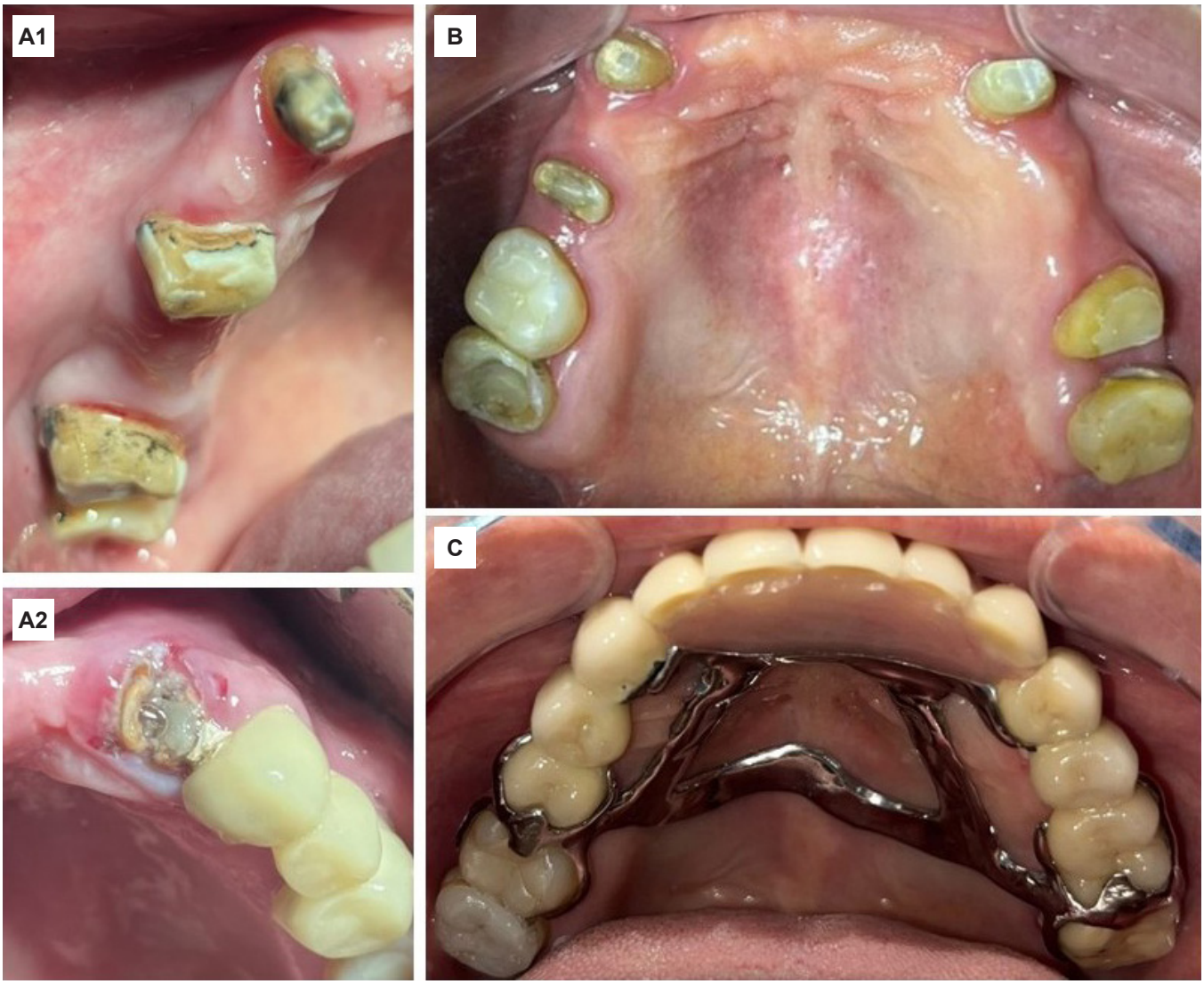

Figure 2. Photographs of the treatment process. A1) Initial condition of teeth #1.3, #1.4, and #1.7. A2) Initial condition of tooth #2.2. A vertical fracture line and gingival erythema are observed. B) Periodontal health and condition of prepared teeth after eleven months of treatment. C) Cementation of fixed tooth-supported prostheses and installation of the completed removable prosthesis.

The immediate outcomes highlight a significant improvement in the patient's masticatory function and dental aesthetics. At five months post-treatment discharge, the patient demonstrates stability in her treatment and maintenance of periodontal health during follow-up visits (Figure 3). This improvement in masticatory capacity allowed the patient to consume foods with greater consistency, such as meat and vegetables, promoting a more balanced and nutritious diet.

Figure 3: Comparisons of initial and final smile. A) Photograph of maximum smile at the start of treatment. B) Photograph of maximum smile at the end of treatment.

DISCUSSION

This case highlights the critical role of oral health in overall well-being, particularly in individuals with systemic conditions such as DM. This chronic condition affects various physiological mechanisms, including insulin resistance, dyslipidemia, hypertension, and immune dysfunction, which can exacerbate oral complications, leading to periodontal disease, delayed healing, and other dental problems, as observed in this case (5). The patient presented with poorly adapted prostheses, biofilm accumulation, and gingival inflammation, which contributed to the deterioration of periodontal health and the progression of carious lesions.

The reduction in masticatory function due to maladjusted fixed prostheses and partial edentulism also has significant implications. Inefficient mastication is a common issue among individuals with tooth loss or poorly fitted prostheses, which can lead to insufficient intake of essential nutrients such as fiber, protein, and minerals (1, 6). Difficulty chewing influences food choices, favoring softer options, often rich in carbohydrates and fats, potentially worsening nutrition and diabetes management (7, 8). Maintaining proper masticatory function is crucial not only for oral health but also for preventing malnutrition and improving overall health in diabetic patients (1).

Studies have shown that restoring masticatory function with dental prostheses has positive effects on the health of diabetic patients. According to a study by Abe et al. (9), the number of natural teeth and masticatory function are inversely associated with diabetes status, suggesting that improved masticatory function may reduce the risk of diabetes progression. This underscores the importance of addressing both aesthetic and functional concerns in treating patients like this, where restoring masticatory efficiency is essential to improving both oral and systemic health.

Periodontal and surgical management in patients with diabetes requires careful planning due to their altered immune response and delayed healing (10). Effective periodontal therapy is crucial, as diabetic patients are more susceptible to periodontal disease, which can further compromise glycemic control if left untreated (11). In this case, periodontal treatment aimed to reduce inflammation enhancing tissue health before initiating prosthetic rehabilitation, ensuring a stable foundation for long-term success. Surgical interventions, such as extractions and the management of retained roots, were

performed with close monitoring to minimize complications. Proper infection control, patient education, and a tailored maintenance program were essential in achieving periodontal stability, contributing to the overall success of the rehabilitation process.

In diabetic patients, prosthetic rehabilitation options must be chosen carefully. Generally, RPDs are preferred over fixed prostheses or implant-based options in cases of partial edentulism, especially in poorly controlled diabetes patients. This preference is due to challenges in achieving implant osseointegration in these individuals, which may lead to poor outcomes (12). In this case, the patient's need for both aesthetic and functional improvements likely influenced the decision to utilize removable prostheses during the transition phase.

Moreover, the placement of new dental prostheses has a protective effect against malnutrition. A study by Kusama et al. (13) demonstrated that dental prostheses reduce the risk of weight loss in older adults, reinforcing the idea that proper prosthetic rehabilitation can prevent nutritional deficiencies associated with tooth loss. Although no immediate significant changes in the patient's dietary intake were observed, restoring her prostheses and masticatory function played a fundamental role in stabilizing her oral and overall health, particularly given her controlled health, which is essential in managing patients with controlled diabetes.

CONCLUSIONS

Dental rehabilitation in patients with DM not only improves mastication and nutrition but also positively impacts overall health and quality of life. In this case, restorative treatment with a mixed prosthesis incorporating precision attachments provided both aesthetic and functional benefits, boosting the patient's confidence and reducing the risk of malnutrition. Interdisciplinary collaboration and a comprehensive approach to dental care can enhance both oral and systemic.

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ES: conceptualization, methodology, writing – review & editing.
NRG: investigation, visualization, writing – original draft.
MCD: conceptualization, methodology, writing – original draft, writing – review & editing.

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REFERENCES

1. Bukhary DM. Teeth rehabilitation and nutritional influence on diabetic patients: a review. Cureus [Internet]. 2023; 15(9): e46182. Available from: https://doi.org/10.7759/cureus.46182
2. Jain R, Aggarwal S. Precision attachments – An overview. Ann Prosthodont Restor Dent [Internet]. 2017; 3(1): 6-9. Available from: https://aprd.in/article-details/3790
3. N'Gom PI, Woda A. Influence of impaired mastication on nutrition. J Prosthet Dent [Internet]. 2002; 87(6): 667-673. Available from: https://doi.org/10.1067/mpr.2002.123229
4. Yahaya JJ, Doya IF, Morgan ED, Ngaiza AI, Bintabara D. Poor glycemic control and associated factors among patients with type 2 diabetes mellitus: a cross-sectional study. Sci Rep [Internet]. 2023; 13: 9673. Available from: https://doi.org/10.1038/s41598-023-36675-3
5. Verhulst MJ, Loos BG, Gerdes VE, Teeuw WJ. Evaluating all potential oral complications of diabetes mellitus. Front Endocrinol [Internet]. 2019; 10: 56. Available from: https://doi.org/10.3389/fendo.2019.00056
6. Gupte R, Shetty M, Hegde C. Influence of wearing complete denture on the glycemic control, serum

lipid, and proteins in patients with diabetes. J Indian Prosthodont Soc [Internet]. 2023; 23(3): 259-265. Available from: https://doi.org/10.4103/jips.jips_284_23

7. Fan Y, Shu X, Leung KC, Lo EC. Association between masticatory performance and oral conditions in adults: a systematic review and meta-analysis. J Dent [Internet]. 2023; 129: 104395. Available from: https://doi.org/10.1016/j.jdent.2022.104395
8. Logan D, McEvoy CT, McKenna G, Kee F, Linden G, Woodside JV. Association between oral health status and future dietary intake and diet quality in older men: the PRIME study. J Dent [Internet]. 2020; 92: 103265. Available from: https://doi.org/10.1016/j.jdent.2019.103265
9. Abe T, Tominaga K, Ando Y, Toyama Y, Takeda M, Yamasaki M, et al. Number of teeth and masticatory function are associated with sarcopenia and diabetes mellitus status among community-dwelling older adults: a Shimane CoHRE study. PLoS ONE [Internet]. 2021; 16(6): e0252625. Available from: https://doi.org/10.1371/journal.pone.0252625
10. Jain A, Chawla M, Kumar A, Chawla R, Grover V, Ghosh S, et al. Management of periodontal disease in patients with diabetes - Good clinical practice guidelines: a joint statement by Indian Society of Periodontology and Research Society for the Study of Diabetes in India. J Indian Soc Periodontol [Internet]. 2020; 24(6): 498-524. Available from: https://doi.org/10.4103/jisp.jisp_688_20
11. Zhao M, Xie Y, Gao W, Li C, Ye Q, Li Y. Diabetes mellitus promotes susceptibility to periodontitis - Novel insight into the molecular mechanisms. Front Endocrinol [Internet]. 2023; 14: 1192625. Available from: https://doi.org/10.3389/fendo.2023.1192625
12. Javed F, Romanos GE. Impact of diabetes mellitus and glycemic control on the osseointegration of dental implants: a systematic literature review. J Periodontol [Internet]. 2009; 80(11): 1719-1730. Available from: https://doi.org/10.1902/jop.2009.090283
13. Kusama T, Nakazawa N, Kiuchi S, Kondo K, Osaka K, Aida J. Dental prosthetic treatment reduced the risk of weight loss among older adults with tooth loss. J Am Geriatr Soc [Internet]. 2021; 69(9): 2498-2506. Available from: https://doi.org/10.1111/jgs.17279