

INTERDISCIPLINARY APPROACH FOR ORAL REHABILITATION IN A YOUNG TYPE 1 DIABETES PATIENT

Anca Jivanescu¹, Luciana Goguta^{1,✉}, Armina Stemper¹, Raul Rotar¹, Luminita Nica²

¹ Department of Prosthodontics, “Victor Babes” University of Medicine and Pharmacy Timisoara, Romania

² Department of Restorative Dentistry and Endodontics, “Victor Babes” University of Medicine and Pharmacy Timisoara, Romania

received: September 11, 2018 accepted: November 29, 2018

available online: December 25, 2018

Abstract

Introduction. The most frequent oral complications of diabetes are periodontal disease and caries. If left untreated, these may lead to tooth loss, with a significant psychological impact, especially in young patients. **Case report.** This case report presents a type 1 diabetes young female patient with periodontal disease, poor decay control and tooth loss, that create functional and esthetic issues. After consulting the diabetes specialist, an interdisciplinary dental treatment plan which comprise surgical, periodontal, endodontic and prosthetic rehabilitation was initiated. Long-term provisional computer-aided design and computer-aided manufacturing (CAD-CAM) fixed partial dentures were fabricated to stabilize the occlusion and to obtain in short term an optimal functional and esthetic rehabilitation. **Conclusion.** This case reveals a consistent collaboration between the prosthodontist, periodontist and endodontist, with an effective monitoring from the diabetes specialist, that conduct to a successful oral rehabilitation for a young female patient with type I diabetes.

key words: type 1 diabetes, periodontal disease, edentulous space, CAD/CAM interim restorations.

Background and aims

Type 1 diabetes (T1D) accounts for over 5% of patients with diabetes and results from a cellular-mediated autoimmune destruction of the β -cells of the pancreas and absolute insulin deficiency [1,2]. Neurovascular complications due to chronic exposure to hyperglycemia leads to development of the neurovascular complications, irrespective of type of diabetes [1-3]. Among other oral pathologies caused by high glycemic values, periodontal disease is the

most prevalent, and when associated with poor oral hygiene, leads to rapid tooth loss [4]. It was shown that diabetes mellitus has a significantly higher incidence of periodontal diseases when compared to the healthy population and also the prevalence increases with age [5-7]. The increased susceptibility of periodontal disease in patients with uncontrolled diabetes can be explained by some mechanisms, like alterations in vascularity, collagen metabolism and host response [8,9]. Also, in T1D patients were found significantly higher levels of some inflammatory

✉ B-dul Revolutiei 1989, Nr.9, 300580 Timisoara, Romania, Tel: +40744273092
corresponding author e-mail: lucianagoguta@yahoo.co.uk

biomarkers in crevicular fluid compare to healthy subjects [2,10].

Systematic treatment of periodontal disease is mandatory in order to maintain a good oral health status. Although it was shown that periodontal treatment has minimal effect on glycemic control, it can improve the quality of life in patients with diabetes [11].

This case presentation reveals the role of the interdisciplinary approach and correct sequence of the treatment plan in oral rehabilitation of a young female patient with type I diabetes. In order to achieve long-term success, a careful consideration was given to improve periodontal health and to restore the functionality and esthetics with long-term provisional computer-aided design and computer-aided manufacturing (CAD/CAM) fixed dental prostheses.

Case presentation

A 21-year-old female patient with T1D presented to the Department of Prosthodontics at the Faculty of Dentistry Timisoara with a chief complaint of unsatisfactory esthetics and functionality due to several missing teeth.

After signing the inform consent, a complete medical and dental history were obtained. Her medical history revealed a T1D, with the onset at age 12, which lately had not been properly controlled (HbA1c=7.2%). The medical history revealed a poor metabolic control by increasing carbohydrate load and incorrect insulin administration. Physical examination documented body weight [68kg] and height [164cm], BMI (body mass index) = 25.3, with a waist circumference =78 and BP= 122/81.

From the dental history appears that the patient undergone specialized surgical and periodontal treatment during the last year, with every three months recall. Since the patient sees no improvements in the aesthetic appearance,

becomes stressed, losing motivation and control over the blood sugar level.

The first visit included clinical extra and intraoral examination. The extraoral examination (Fig. 1) revealed no facial asymmetry, an average smile line and no muscular tenderness. Temporomandibular joint (TMJ) palpation revealed articular noises without pain. The following maxillary teeth were missing: central incisors and lateral incisor on the left side, first premolar and molar on the right side and second premolar and molar on the left side. On the lower were missing central and lateral incisors, first premolar and first and second molar on the right side and on the left side the first molar. The patient presented class III Kennedy modification 3 at the maxilla and mandible, with increased bone resorption in the frontal region due to missing teeth from periodontal disease.



Figure 1. Clinical endo-oral aspect in occlusion at the presentation.

The periodontal diagnosis was generalized moderate periodontitis with localized severe periodontitis on the maxillary right premolar.

Endodontic treatment was performed on the following teeth: 1.7, 1.5, 1.3, 1.2, 2.3, 2.4, 2.6, 3.3, 3.4, 3.5, 3.7, 4.3, 4.5 (Fig. 2).

Treatment objectives were to control periodontal disease and to restore functionality and aesthetics of the patient.

Prosthetic treatment was started with an occlusal analysis. A first set of impressions were

taken and diagnostic casts were then poured, and mounted in a semi-adjustable articulator (Artex, Armann Girbach) at the proposed vertical dimension of occlusion. The first diagnostic wax-up was realized in the dental laboratory, in order to discuss with the patient, the aesthetic and functional outcomes and the first set of provisional restorations were fabricated in the dental laboratory and tried in the patient mouth. (Fig. 3).



Figure 2. Orthopantomography after periodontal and endodontic therapy



Figure 3. Patient's smile with the first set of provisional restoration.

Interim restorations (Luxatemp, DMG) were fabricated at the correct vertical dimension of occlusion (VDO), tried in the patient mouth and occlusion was adjusted. After the patient realized that her appearance can be improved, she started being motivated in having a good control of her glycemic values and maintaining a good oral hygiene.

The second step of the prosthetic treatment was to obtain a functional an esthetic full mouth rehabilitation with fixed dental prostheses. Therefore, a second wax-up was developed with an 2 mm increase of the vertical dimension of occlusion (Fig. 4).

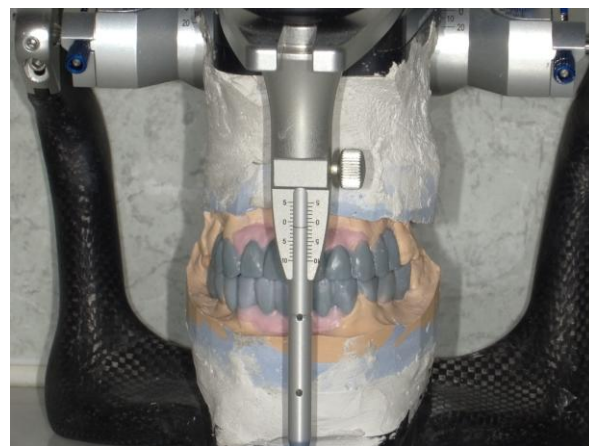


Figure 4. Wax-up of the final morphology on both dental arches.

A full mouth rehabilitation with long-term interim fixed dental prostheses realized with CAD-CAM technology and Telio CAD (Ivoclar, Vivadent) material was completed, in order to maintain the new established VDO and to achieve an adequate esthetic appearance (Fig. 5).



Figure 5. CAD/CAM long-term provisional fixed dental prostheses for maxillary and mandibular arches.

The patient was evaluated every three months for periodontal status, oral hygiene and functionality of the prosthetic restorations. The patient was satisfied by the esthetic results, gain

confidence and began to have a much more active social life (Fig. 6).



Figure 6. Smile of the patient at a six-month recall.

Discussion

In young patients with T1D, the incidence of chronic gingivitis is significantly higher than in the healthy population [2,12]. Periodontal disease can lead to tooth loss, collapsed dental arch and malocclusion, requiring extensive prosthetic rehabilitation in order to restore function and aesthetics. If periodontal disease is well controlled, teeth with reduced periodontal support can be used as abutments for extensive fixed dental prostheses [13,14].

Most of diabetic patients can easily be managed in dental office. A constant collaboration with the diabetes specialist is needed, especially when blood glucose level exceeds 200 mg/dl. Minor surgical procedures

can be performed using local anesthesia and usually prophylactic antibiotic coverage is necessary [15].

In this case of type I diabetes patient, with tooth loss and periodontal disease, selection of the treatment modalities was influenced also by the young age of the patient. It is mandatory to have a proper cooperation with the patient. In order to maintain the remaining teeth for a longer period of time, every three months recall, and a good oral hygiene is required. Long-term CAD/CAM provisional fixed dental prostheses can assure the evaluation of the abutment status and of the occlusion, in order to prevent any further complications. For final restorations, dental implants associated with bone augmentation and sinus lift procedure can be considered.

Conclusions

This case revealed that extensive oral rehabilitation in a young patient with T1D should be performed with an interdisciplinary team approach, to manage periodontal disease, intermaxillary relationships, and to restore all edentulous spaces, in order to fulfill the biological, mechanical and esthetic principles.

REFERENCES

1. ADA. Classification and diagnosis of diabetes. *Diabetes Care* 40: S11–S24, 2017.
2. Duda-Sobczak A, Zozulinska-Ziolkiewicz D, Wyganowska-Swiatkowska M. Type 1 Diabetes and Periodontal. *Health Clin Ther* 40(6):823-827, 2018.
3. Menke A, Casagrande S, Geiss L, Cowie CC. Prevalence of and trends in diabetes among adults in the United States, 1988-2012. *JAMA* 2314(10): 1021-1029, 2015.
4. Loë H. Periodontal disease. The sixth complication of diabetes mellitus. *Diabetes Care* 16(Suppl 1): 329-334, 1993.
5. Chapple IL, Genco R. Working group 2 of the joint EFPAAP workshop. Diabetes and periodontal diseases: consensus report of the Joint EFP/AAP Workshop on Periodontitis and Systemic Diseases. *J Periodontol* 84: S106–S112, 2013.
6. Eke PI, Dye BA, Wei L, et al. Update on Prevalence of Periodontitis in Adults in the United States:

NHANES 2009 to 2012. *J Periodontol* 86(5): 611-622, 2015.

7. **Lamster IB, Cheng B, Burkett S, Lalla E.** Periodontal findings in individuals with newly identified pre-diabetes or diabetes mellitus. *J Clin Periodontol* 41: 1055–1060, 2014.

8. **Schenkein HA.** Host responses in maintaining periodontal health and determining periodontal disease. *Periodontol 2000*. 40(1): 77–93, 2006.

9. **Mark Bartold P, Van Dyke TE.** Host modulation: controlling the inflammation to control the infection. *Periodontol 2000* 75(1): 317–329, 2017.

10. **Salvi GE, Franco LM, Braun TM, et al.** Pro-inflammatory biomarkers during experimental gingivitis in patients with type 1 diabetes mellitus: a proof-of-concept study. *J Clin Periodontol* 37(1): 9–16, 2010.

11. **Vergnes JN, Canceill T, Vinel A et al.** The effects of periodontal treatment on diabetic patients: the

DIAPERIO randomized controlled trial. *J Clin Periodontol* 45(10): 1150-1163, 2018

12. **Novotna M, Podzimek S, Broukal Z, et al.** Periodontal diseases and dental caries in children with type1 diabetes mellitus. *Mediators Inflamm* 2015:379626, 2015.

13. **Lundgren D.** Prosthetic reconstruction of dentitions seriously compromised by periodontal disease. *J Clin Periodontol* 18: 390–395, 1991.

14. **Kourkouta S, Hemmings KW, Laurell L.** Restoration of periodontally compromised dentitions using cross-arch bridges. Principles of perio-prosthetic patient management. *Br Dent J* 203(4): 189-95, 2007.

15. **Tsukamoto K, Cnop M, Mori D et al.** Future Perspectives for the Treatment of Diabetes: Importance of a Regulatory Framework. *Ther Innov Regul Sci*, 2018.