## **Turkish Journal of Dental Hygiene**

2021, Volume 1, Page No: 9-15 Copyright CC BY-NC-SA 4.0 Available online at: <u>www.tsdp.net</u>



## **Case Report**

# Oral Hygiene Challenges in Diabetic Patients with Bell's Palsy: A Longitudinal Study

# I.M.J. Pruijn<sup>1\*</sup>, S.T.H. Reerds<sup>1</sup>, D.J. Wellenstein<sup>1</sup>, C.H. Nabuurs<sup>1</sup>, H.W. Schutte<sup>1</sup>

<sup>1</sup>Department of Otorhinolaryngology and Head and Neck Surgery, Radboud University Medical Center, Nijmegen, the Netherlands.

\*E-mail 🖂 Ineke.Pruijn@radboudumc.nl

Received: 10 May 2021; Revised: 28 July 2021; Accepted: 02 August 2021

## ABSTRACT

The disorder of Bell's palsy can adversely affect oral infections and dental caries, especially in diabetic patients. This occurs primarily due to xerostomia and weakness of the facial muscles, both of which are closely linked to food impaction in the area between the cheeks and teeth. Alongside the fact that patients with neuromuscular disorders are unable to maintain proper oral hygiene. Moreover, research has shown that the survival of dental implants is minimally affected by diabetes that is effectively managed. This study introduces a case of a patient with diabetes and Bell's palsy who underwent treatment for several dental implants. The study includes a 23month follow-up on this treatment, focusing on oral hygiene assessments and explanations of findings. A 49year-old female patient presented at the King Abdulaziz University dental clinics to have her missing posterior prosthesis replaced. The patient was diagnosed with type II diabetes a decade ago and with Bell's palsy two decades ago. Her dissatisfaction with her teeth had a detrimental effect on her quality of life. Restorative care, endodontic retreatment, and prosthetic replacement using fiber post-placement, zirconia, lithium disilicate, porcelain fused metal crowns, and a two-stage implants placement method were included in the treatment. After 23 months of examination, there were encouraging results and a successful dental implant procedure in a patient with all these difficult circumstances. However, it was determined that in order to manage these instances and avoid their detrimental consequences on oral health, oral care practitioners should be aware of the oral symptoms of various conditions. However, it was highly recommended to give oral hygiene instructions (OHI) and to keep an eye on the issue by scheduling follow-up sessions on time.

Keywords: Bell's palsy, Diabetes, Follow-up, Implant, Oral hygiene

How to Cite This Article: Pruijn IMJ, Reerds STH, Wellenstein DJ, Nabuurs CH, Schutte HW. Oral Hygiene Challenges in Diabetic Patients with Bell's Palsy: A Longitudinal Study. Turk J Dent Hyg. 2021;1:9-15. https://doi.org/10.51847/JOQ4PMDvVx

#### Introduction

Numerous neuromuscular disorders affect the maxillofacial and oral areas, including Bell's palsy, characterized by a abrupt onset of acute idiopathic peripheral facial nerve paralysis, which constitutes approximately 75% of cases of acute facial nerve paralysis [1-4]. Characteristics of facial muscle weakness include the inability to self-clean the vestibular area and the deviation of the mouth angle towards the healthy side when speaking, blowing, whistling, or laughing [5]. Successful treatment outcomes are linked to early diagnosis [6]. A higher

intensity of the onset attack correlates with a lower percentage of full recovery [4]. Additionally, it has been explained that bell's palsy results in parageusia, hyperacusis, and disordered lacrimation or salivation, which affect the maintenance of proper oral hygiene [7]. Thus, it is important for dentists to be particularly careful when treating patients with facial paralysis during dental procedures [3]. One aspect of this is that they should ensure the prosthesis is aligned with the occlusal level in oral rehabilitation, regardless of any asymmetry present in the facial and oral structures [8]. Moreover, dental implants are now regarded as an effective and essential solution for replacing lost teeth [9]. With suitable treatment strategies, preventive actions, and sufficient post-operative oversight, the efficacy of dental implants in monitored diabetic patients ought to be on par with that of individuals without diabetes [10]. When food particles accumulate over time, this can lead to inflammation of the soft tissues around the implant (marked by bleeding, pain, and swelling) [11]. As a result, it is crucial to schedule regular follow-up appointments for these patients in order to uphold oral hygiene [9].

This case report's objective was to:

- Describe the state of oral hygiene in a patient with Bell's palsy who has controlled diabetes.
- After around two years, check on several dental implants in patients with Bell's palsy and diabetes.

# Case report Background

A 49-year-old woman from Saudi Arabia was referred to the dental practice at King Abdulaziz University Hospital in Jeddah. The main complaint is: "I want to return my missing bridge on the lower right side because I can't eat well; it was missing 4 years ago." The patient has a history of type II diabetes lasting over 10 years and Bell's palsy occurring 20 years ago, with no reported allergies. At present, she is receiving treatment for diabetes with Metformin (500 mg) and Glimepiride (3 mg).

The patient stated that vigorous horizontal tooth brushing resulted in greceeding of the gums. The extraoral examination showed facial asymmetry while smiling and an showed lip incompetence at rest (**Figure 1a**). The intra-oral examination disclosed gingivitis caused by dental biofilm, multiple missing teeth, secondary caries, and restorations that were inadequate and associated with poor plaque control.



b)

Figure 1. a) Pre-operative extra-oral and intra-oral photos including forced smile, frontal, lateral and occlusal views. b) Pre-operative OPG.

As illustrated in **Figure 1b**, patient data were subsequently gathered using (Orthopantomogram (OPG), CBCT, mounted casts, smile, and occlusal analysis). The regimen of therapy was reviewed with the patient following receiving her written consent and recorded in her hospital files. The therapy approach comprised replacing poor restorations and edentulous teeth with dental implants, depending on a diagnostic wax-up, evaluation of bone quantity by Cone-beam computed tomography radiography, and a regulated HBA1C level of 7%.

# Case description

The non-surgical phase of treatment commenced with adult prophylaxis, scaling, caries excavation, and final restorations on #18, 15, 25, 26, 28, and 44. Initial

preparation of #17 to address the super-eruption, along with temporization of #45 and #48, habit control, and construction of a night guard. Following a 4-week reevaluation and multidisciplinary consultations, nonsurgical root canal retreatment of #34 was performed. Subsequently, the #16, 14, 46, and 47 implant fixtures will be positioned. During the transition to the restorative phase, composite restorations for teeth fractures on #21 and #31, crowns for #17, #34, #45, and #48, as well as implant crowns for #16, #14, #46, and #47 were completed.

Concerning implants, following the administration of infiltration on the buccal and lingual sides of #14,16 with articaine 2% and epinephrine, as well as a lower right inferior alveolar nerve block, full mucoperiosteal flaps were raised. An implant osteotomy was then prepared using a surgical guide based on the diagnostic wax-up. Straumann/fast healing slaActive screw

coated implants measuring 3.3 by 10 mm were inserted at #14 and #16, while 4.1 by 10 mm variants were placed at #46 and #47, achieving an initial stability of 40N. To ensure sufficient healing around the implant (Figure 2), soft tissues were stitched with several interrupted absorbable sutures (VICRYL polyglactin). Cover screws were removed and healing abutments were installed after six weeks, when the tissues had fully healed. The correct positioning of zirconia screwretained implant crowns on (#14, 16, 46, and 47) was verified by post-operative bitewing radiography. A flowable composite resin restoration was applied after cotton pellets were placed into the screw holes to seal the holes. Occlusion was checked using articulator paper and a shim stock. Canine guidance was established without intervention. Radiographs and photographs taken after surgery were documented (Figure 3).





b)

Figure 2. a) Implants placement #14 and 16. b) Implants fixture placement radiographs #14,16,46 and 47.



**Figure 3.** a) Zirconia screw-retained implant crowns #14,16,46 and 47. b)Zirconia screw-retained implant crowns radiographs #14,16,46 and 47.

Oral health can be compromised by Bell's palsy, as illustrated by its impact on saliva production due to damage to the facial nerve [7]. Due to experiences of xerostomia, this disorder may contribute to oral infections and dental caries, particularly in diabetic patients [12]. Research has shown that the prevalence of dental caries among diabetic patients exceeds that of healthy individuals. This phenomenon is linked to elevated glucose concentrations in saliva, which result in reduced pH levels [13, 14]. Additionally, alterations in taste sensation, hearing, or lacrimation problems, along with challenges in chewing and speaking, will negatively impact the patient's quality of life [3, 7]. Additionally, facial neuromuscular disorders may be linked to saliva drooling at the mouth's corners, leading to angular cheilitis [3, 7]. Bhat *et al.* (2010) [5] observed a significant link between facial muscle weakness and the aggregation of food in the vestibule in-beteew the buccal and teeth, especially impacting the orbicularis oris, buccinator, and masseter muscles [5, 8]. As a result of the compromised function of the masseter and buccinator muscles, plaque accumulation will occur on the teeth on the affected side [3]. Additionally, patients with diabetes and those with Bell's palsy both experience hyposalivation. This results in difficulties with speaking, tasting, and swallowing; it can also cause problems such as halitosis, infections of soft tissues, and a rise in cavities [15, 16]. Decreased saliva

production compared to normal will significantly impact the ability to cleanse, remineralize, lubricate, repair tissue, and exert antimicrobial effects [17]. As a result, these factors will have a detrimental effect on oral health status [3]. Dentits must therefore encourage patients with facial paralysis and stress the importance of oral hygiene by suggesting the use of an interdental brush or dental water jet for flossing, as well as electric brushes to support limited self-cleansing. They should also recommend Biotine or sugar-free gum and advise these patients to rinse their mouths immediately after meals to eliminate food buildup in the vestibule (**Figure 4**).



Figure 4. The dental caries care approach used in this documented case was for a diabetic patient with Bell's palsy.

Patients with facial paralysis need special care during dental treatment, as shown in a study by Khator and Motwani (2019) [3]. Dentists, for instance, must identify a symmetrical expression of this condition in order to accurately recreate the proper occlusal scheme during rehabilitation treatment.

The 2020 study by Tom Shokri *et al.* [18] demonstrated that, like the patient described in this case report, the predominant methods of managing facial paralysis

were either nonsurgical or included no intervention at all. Despite this, they discovered that further study adheres to several regimens, including physiotherapy, medication, surgery, and even chemodenervation. This essay examines a patient's visit to the dentistry clinic at King Abdulaziz University. She needed therapy for her diabetes, which has been under control for 10 years, and replacement treatment for her lost teeth after receiving a Bell's palsy diagnosis twenty years ago. Considering all of these details regarding how Bell's palsy affects oral health, the clinic addressed her primary concern mainly with implants and prostheses after educating the patient about her oral health, providing advice on proper oral hygiene, and informing her of the facilities for oral care that were available.

many literatures have reported that the longevity of dental implants in diabetic patients that is controlled are comparable to those of healthy individuals [10, 19, 20], provided there is adequate post-operative follow-up [10]. Nevertheless, the ongoing trapping of food particles may result in periimplantitis [11]. In light of these circumstances, it was essential to uphold regular follow-up visits that considered the difficult factors we faced in this case: diabetic individual, high caries risk, and facial palsy condition.

After 8 months, the first follow-up visit was scheduled so as to maintain oral health and evaluate the status of implants and prostheses. Patient indicated some difficulties with brushing. No clinical or radiographic signs or symptoms were observed after the endodontic re-treatment of lower left 1st premolar. Concerning prostheses, all were fitted without any marginal catch or recurrent caries detected, and occlusion was verified. The amount of keratinised tissue and the colour and texture of the soft tissue surrounding the implants were assessed. But there was only a slight hint of redness. The OPG findings were typical. In light of these results, OHI was improved by teaching the patient the proper way to wash their teeth in order to lessen gingival irritation (Figure 5a). We were able to conduct the second follow-up visit in September 2020, roughly 23 months later, taking into account all the precautions associated with the COVID-19 outbreak, to evaluate the patient's compliance, oral hygiene status, and their impact on the implants. The patient reported no pain or discomfort associated with the prosthesis or implant treatment during this visit. The patient acquired more instructions on dental health and will be postponed for scaling and fluoride implementation after the COVID-19 pandemic concluded. The soft tissue was checked for bleeding, suppuration, or inflammation. Bone levels were assessed using intraoral radiographs and CBCT. The results showed a normal status (Figure 5b), providing affirmative commentary on the effectiveness of the implant treatment in this instance, given all the relevant factors. At the end of the appointment, an emergency intervention was not required.







Figure 5. a) 1st follow up-8 months-OPG. b) Second follow up-23 months- intra oral photos, implants PA and BW radiographs. c) implants evaluation on CBCT.

# Conclusion

In summary, the present study demonstrates a positive dental implant treatment for a individuals with diabetes with Bell's palsy following the control of their oral health standing and initiating the maintenance phase along with a thorough home oral care routine. With a good prosthesis that restores function and healthy soft tissue surrounding the implants, the patient has survived the procedure. To prevent and manage negative consequences-especially in the wake of a reported case that was well received-general practitioners need to have a comprehensive grasp of the oral manifestations of facial disorders and how these affect oral health. Research suggests that wellmanaged diabetes has little to no effect on the survival of dental implants. To avert the risk of minor complications turning irreversible, it was highly recommended to keep an eye on oral hygiene and to arrange routine follow-up visits.

Acknowledgments: The authors expressed their gratitude to Dr. Abdulkareem AlHumaidan, Assistant professor of periodontology at Imam Abdulrahman Bin Faisal University. And Dr. Ammar AlMarghlani, Assistant professor of periodontology at King Abdulaziz University, for their expert assistance and special thanks to Dr. Yomna Alsahafi for her clinical input.

## Financial Support: None

#### Ethics Statement: None

#### References

- González AF, Cairo CR, Gaitén YI, Lizama RS, Rodríguez AC, Foubert K, et al. Diuretic activity and acute oral toxicity of Caesalpinia bahamensis Lam. extracts (Brasilete). Int J Pharm Phytopharmacol Res. 2020;10(3):65-9.
- 2. Khatian N, Ali I. Formulation and evaluation of ziprasidone Hcl Oral controlled release matrix tablets. Pharmacophore. 2020;11(6):41-7.
- Khator AM, Motwani M. Neuromuscular disorders affecting the oral and maxillofacial region and their dental management. Int J Dent Res. 2019;4(1):13-9. doi:10.31254/dentistry.2019.4105
- Hassan A, Mustafa K, Suleiman AM. Bell's palsy: a prospective study. Int J Dent. 2020;2020:2160256. doi:10.1155/2020/2160256
- Bhat S. Srb's clinical methods in surgery, 3rd edition. New Delhi, Jaypee Brothers Medical Publishers; 2019. p. 311-2
- McKernon S, House AD, Balmer C. Facial palsy: aetiology, diagnosis and management. Dent Update. 2019;46(6):565-72. doi:10.12968/denu.2019.46.6.565

#### Conflict of Interest: None

- Williams NS, Bulstrode CJK, O'Connell PR. Bailey and love's short practise of surgery. 25th ed. England: bailey and Love; 2008. p. 699-700.
- Ilea A, Cristea A, Țărmure V, Trombitaş VE, Câmpian RS, Albu S. Management of patients with facial paralysis in the dental office: a brief review of the literature and case report. Quintessence Int. (Berl). 2014;45(1):75-86. doi:10.3290/j.qi.a30770
- Li CX, Wang F, Jin ZL. A four-year prospective study of self-assembling nano-modified dental implants in patients with type 2 diabetes mellitus. J Dent Sci. 2020;15(3):294-301. doi:10.1016/j.jds.2020.03.013
- Dubey R, Gupta D, Singh A. Dental implant survival in diabetic patients; review and recommendations. Natl J Maxillofac Surg. 2013;4(2):142. doi:10.4103/0975-5950.127642
- Bidra AS. Nonsurgical management of inflammatory peri-implant disease caused by food impaction: a clinical report. J Prosthet Dent. 2014;111(2):96-100.

doi:10.1016/j.prosdent.2013.06.017

- López-Pintor RM, Casañas E, González-Serrano J, Serrano J, Ramírez L, de Arriba L, et al. Xerostomia, hyposalivation, and salivary flow in diabetes patients. J Diabetes Res. 2016;2016:4372852. doi:10.1155/2016/4372852
- Rai K, Hegde AM, Kamath A, Shetty S. Dental caries and salivary alterations in type I diabetes. J Clin Pediatr Dent. 2011:36(2):181-4. doi:10.17796/jcpd.36.2.x436ln878221g364
- 14. Seethalakshmi C, Reddy RJ, Asifa N, Prabhu S. Correlation of salivary pH, incidence of dental

caries and periodontal status in diabetes mellitus patients: a cross-sectional study. J Clin Diagn Res. 2016;10(3):ZC12-4. doi:10.7860/JCDR/2016/16310.7351

- 15. Genco RG, Borgnakke WS. Diabetes as a potential risk for periodontitis: association studies. Periodontol 2000. 2020;83(1):40-5. doi:10.1111/prd.12270
- Borgnakke WS, Anderson PF, Shannon C, Jivanescu A. Is there a relationship between oral health and diabetic neuropathy? Curr Diab Rep. 2015;15(11):1-9. doi:10.1007/s11892-015-0673-7
- Dodds M, Roland S, Edgar M, Thornhill M. Saliva a review of its role in maintaining oral health and preventing dental disease. BDJ Team. 2015;2(1-8):1-3. doi:10.1038/bdjteam.2015.123
- Shokri T, Saadi R, Schaefer EW, Lighthall JG. Trends in the treatment of bell's palsy. Facial Plast Surg. 2020;36(05):628-34. doi:10.1055/s-0040-1713808
- Jiang X, Zhu Y, Liu Z, Tian Z, Zhu S. Association between diabetes and dental implant complications: a systematic review and metaanalysis. Acta Odontol Scand. 2021;79(1):9-18. doi:10.1080/00016357.2020.1761031
- Alberti A, Morandi P, Zotti B, Tironi F, Francetti L, Taschieri S. Influence of diabetes on implant failure and peri-implant diseases: a retrospective study. Dent J. 2020;8(3):1-8. doi:10.3390/DJ8030070