



Total Oral Rehabilitation with Dental Implants in an Elderly Patient with Concomitant Diseases: a Case Report

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Abstract

We report a case of restoration of the masticatory and phonetic functions of a senior patient with comorbidities who receives systemic medication and lacks sufficient bone volume for implant placement in the accurate position. X-ray shows severe asymmetric atrophy of the mandible, especially on the right side, which affects the location of the mandibular canal. This greatly limits and complicates the restoration of the masticatory and phonetic functions with conventional prostheses. Adequate management of medication and long-term disease control of the patient allow safe surgery for tooth extraction and placement of intraosseous implants in the jaw bones.

Keywords

concomitant diseases, dental implants, hydrophilic, oral rehabilitation

INTRODUCTION

Treatment planning is of great importance in implant dentistry. The available height and width of the alveolar ridge are crucial for dental implant placement in the upper and lower jaws. Knowledge of the anatomy of jaw bones, especially in the mandible, and of the course of mandibular canal is important for the successful outcome of the implant procedure. Dental rehabilitation of patients with compromised edentulous area, significant atrophy of alveolar bone in the right mandible is a challenge for rehabilitating. Failure to identify anatomical landmarks can lead to complications such as traumatic neuroma, paresthesia, and bleeding. Conventional removable dentures have a lot of drawbacks such as lack of stability, minimal retention, and discomfort in chewing. The ability of cells to migrate and attach to the surface of an implant is determined by the adsorption of proteins. Hydrophilic surfaces show a higher af-

finity for proteins than hydrophobic surfaces. Implants with a hydrophilic surface have an electropositive layer of titanium oxide. Physicochemical activation of the surface changes the negatively charged surface into a positive one, attracting ions from the blood. Hydrophilicity stimulates the differentiation and maturation of osteoblasts, thus contributing to the acceleration of osseointegration.¹⁻³ A number of concomitant diseases can disrupt the process of osseointegration and lead to implant failure. Proper management of medication and systemic diseases can make a contraindication for surgery relative. Patients suffering from osteoporosis undergoing bisphosphonates therapy are at an increased risk of developing bone necrosis after an oral surgery, especially if the drugs are administered intravenously or they are associated with certain concomitant medication.⁴

In patients with compromised medical status, there is a higher risk of interactions between their disease and the implant surgery implying a higher medical risk. These

patients need to fill in a medical questionnaire and undergo a preliminary exhaustive medical examination that will help to not only determine the specific measures that should be taken but also to make an assessment of the patient's risk. The aim of this study was to present a case of successful dental rehabilitation with restored masticatory function through dental implants in a 70-year-old patient with a number of chronic diseases.

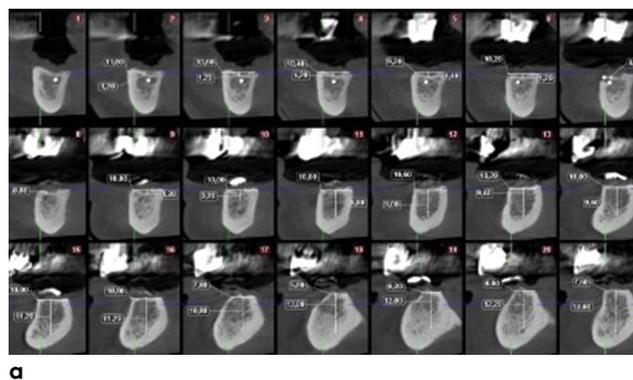
CASE REPORT

A 70-year-old female patient was referred to our surgical practice because of partially edentulous mandible and maxilla and complaints related to unsuccessful treatment with removable dentures. The intraoral status of the patients was partially edentulous upper and lower jaws as revealed by the examination. The patient had a crown on tooth 12, some of the teeth were fractured, mobile, and others had deep carious lesions on the root surface (Fig. 1). Generalized periodontitis was detected. The patient's masticatory function, phonetic function, and aesthetic appearance were impaired.

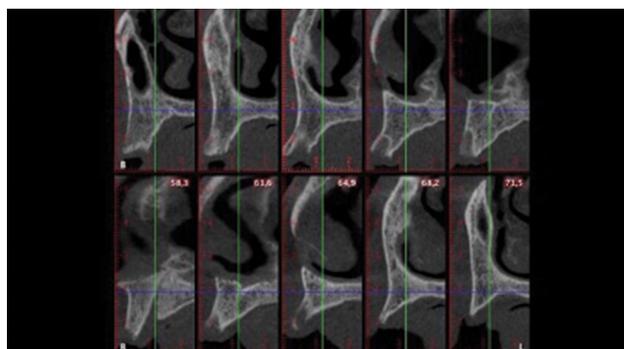
The following concomitant diseases were reported by the patient which was the reason she was denied treatment previously with dental implants: type 2 diabetes, stage 2 hypertension, atrial fibrillation, osteochondrosis of the lumbar vertebrae, discopathy at L1-2, macular degeneration, and osteoporosis. Current medications: Micardis+ (Boehringer Ingelheim), Eliquis (Bristol-Myers Squibb Kft.), Renovia (Berlin-Cheme), Moxogamma (Woerwag Pharma), So-



Figure 1. Preoperative orthopantomogram.



a



b

Figure 2. Cone-beam computed tomography. Sagittal view before implants placement: (a) lower jaw and (b) upper jaw.

tahexal (Sandoz d.d), Glucophage (Merck Sharp & Dohme Ltd.), Preductal (Les Laboratoires Servier). The patient received vit. D and calcium for the osteoporosis. Radiographic study showed significant bone loss in the left maxillary and right mandibular region, and a high location of the mandibular canal. Advanced bone atrophy did not allow good retention of conventional prostheses (Figs 2, 3).

The patient underwent a number of paraclinical examinations and consultations with clinicians. After analysis of the paraclinical data and clinical examination, it was concluded that she had her diseases under good control receiving the proper medication to achieve this. Several alternative treatment plans were suggested to the patient. It was decided to perform surgical treatment by placing dental implants with a hydrophilic surface in the upper and lower jaw. In this case, it was chosen to use implants with a high energy surface and a small contact angle on the surface of the implant, which favours and accelerates the process of osteointegration.⁵

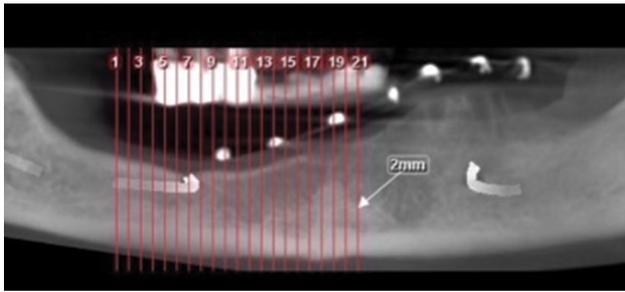
Two visits were needed to extract the teeth that were not perspective. Temporary removable prostheses were prefabricated for a period of 3 months. The implant placement procedure was divided into two sessions:

- in the first, four implants (Neodent Helix, 140.983) were placed in the lower jaw.

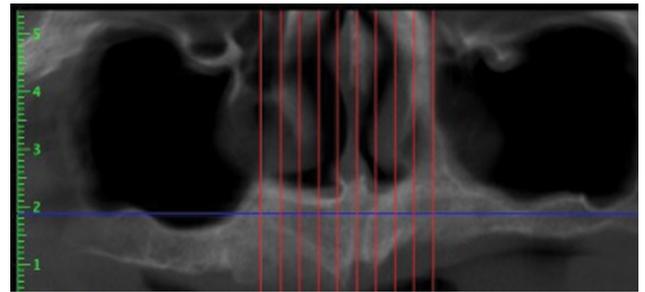
- in the second, four implants were placed in the maxilla.

The standard implant placement protocol was implemented as recommended by the manufacturer (Fig. 4). The postoperative period was uncomplicated and the patient was monitored weekly. Two months after implantations, the abutments were placed. Only small incisions were made due to exposure of the implants (Fig. 5). In this case, the implants were not placed in a position typical for a complete edentulous mandible - in the frontal area of the mandible, due to the risk of permanent damage to the inferior alveolar nerve (Fig. 6).

The prostheses were corrected. After two weeks the impression was made and after another 2 weeks, the prostheses were fixed to the supports with Novaloc[®] abutments (GM Novaloc;102.163; 102.169), titanium matrix (2010.703-STM) and Retention Insert (2010.711-STM; 750 g). A direct approach was used to fix the retentions (Fig. 7). A new X-ray was then taken to see if there was proper contact between the superstructures and supports in the prosthesis (Figs 8, 9).



a



b

Figure 3. Cone-beam computed tomography. Coronal view before implants placement: (a) lower jaw and (b) upper jaw.

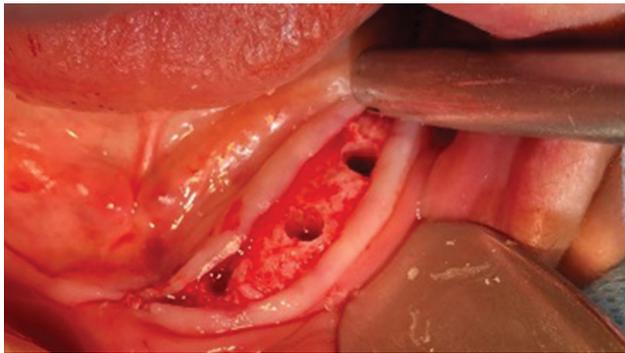


Figure 4. Intraoral view during the surgery.

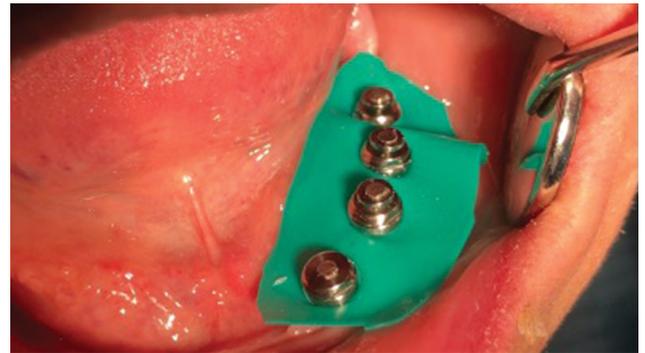


Figure 7. Intraoral view during direct approach to fix the retentions.



Figure 5. Intraoral view after placement of gingiva former of the implants in lower jaw.

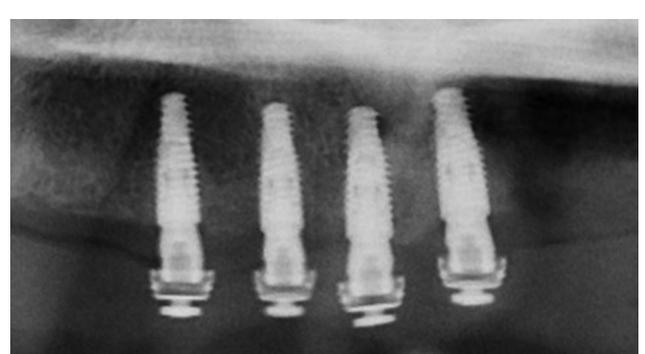


Figure 8. X-ray of implants after fixation of the retentions in the upper jaw.



Figure 6. Patient orthopantomography after the implant placement.

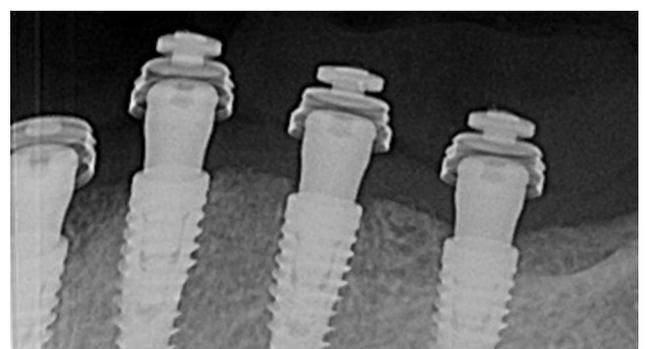


Figure 9. X-ray of implants after fixation of the retentions in the lower jaw.

DISCUSSION

The presence of chronic diseases in patients is often a reason to refuse dental implant treatment. Some concomitant diseases pose a serious risk for peri- and postoperative complications, which seriously endangers not only the results of the proposed treatment plan, but also the medical condition of the patient.

The medical history allows us to identify the systemic disease and the success rate expected in the medically compromised patients that is going to be rehabilitated with dental implants. It seems like the medical control of the disease is more important than the disease itself. This indicates clearly the need of carrying out personalized medical examinations of the patients.

Osteoporosis is a common skeletal disease and is characterized by low bone density of the bone tissue. The condition affects about 200-300 million individuals worldwide. In osteoporosis, improper bone formation leads to deterioration of the microstructure of the trabecular bone and increases the porosity. For this reason, when planning implant placement, patients should be questioned in detail about concomitant diseases and medications. Impaired bone metabolism can disrupt proper osseointegration and be the cause of implant loss.⁶⁻⁸

In literature, there are some reports for a high failure rate in patients with osteoporosis and significant bone loss around the implant crest module after loading. Other authors report a small number of failures in patients with impaired bone metabolism. This disease is not a contraindication to implant placement if appropriate preparation is performed, which consists in the choice of right implant shape, implant-abutment connection and surface modification. Implants placed in patients with osteoporosis do not lead to a higher complication rate than those placed in patients without osteoporosis.⁹

Data from literature confirms that not only surgical insertion of dental implants is a potential risk factor for the development of osteonecrosis but also the presence of the implant into the bone can be associated with this disease. Patients should be informed about the increased risk for the medication-related osteonecrosis of the jaw. The same information should be provided for patients who have already had osteointegrated implants and are going to receive oral bisphosphonate (BPT) treatment or are going to start this therapy after the implant's placement. The risk is lower for patients receiving oral bisphosphonates but it exists and seems to be higher if the implant is located in the posterior areas, if the duration of BPT is more than 3 years and if the patient is on corticosteroid therapy.¹⁰ Our patient did not receive bisphosphonates for osteoporosis treatment. She was prescribed only vitamin D and calcium.

Diabetes is the most common endocrine disease. In the past, implant placement has been contraindicated in patients with diabetes because of the increased risk of implant failure. Published scientific articles in recent years have confirmed a high success rate in dental implantology

in patients with controlled diabetes. Dental implant success rate in well controlled diabetics is 100% to 96.4%, which doesn't differ from that in healthy patients. Most unsuccessful cases with implants are observed in the first year after placing a prosthetic structure.¹¹⁻¹³

Dental implant placement is a safe and predictable procedure for rehabilitation of patients with well controlled diabetes. Good glycemic control does not impair osseointegration. To reduce postoperative complications, preoperative prophylaxis with antibiotics and the use of chlorhexidine mouthwash prior to surgery are recommended.^{14,15}

The most commonly used drugs in anticoagulant and antiaggregant therapy are acetylsalicylic acid, clopidogrel, warfarin, Eliquis and heparin/fraxiparin. This type of medication is received by patients who are at a high risk of developing thromboembolism, as well as in the prevention of heart attack, stroke, pulmonary embolism, atrial fibrillation, mitral stenosis, after heart surgery and others. In oral surgery, two aspects need to be considered: bleeding that may occur during or after surgical implant placement. Risk of thromboembolism upon discontinuation of anticoagulant therapy is presented. Treatment with dental implants in patients with such therapy is not contraindicated. After consultation with the clinicians that prescribed anticoagulants or antiaggregants and the assessment of risk for patient, the procedure could be initiated. According to some authors and guidelines, discontinuation of therapy for minor oral surgeries, such as single tooth extraction or implant placement, is not recommended. The following does not apply to autogenous bone graft procedures, extensive flap, more than one implant placement in which the anticoagulant and antiaggregant medication should be discontinued. Fraxiparin could be prescribed in high risk patients.¹⁶⁻¹⁸

Controlled cardiac systemic diseases, diabetic endocrine pathologies or metabolic disorders do not seem to be a total or partial contraindication to the placement of dental implants.¹⁹⁻²¹

CONCLUSIONS

Medical advances have made possible the increase of the survival rate of certain types of medically compromised patients, increasing thus the prevalence of these patients who request the rehabilitation of their total or partially edentulous jaw bones with dental implants. This is due to the high success rate of this surgical technique and its benefits to the patients' functions (mastication, phonetics and esthetics) and quality of life. Nowadays, dental implantology provides opportunities for the treatment of completely edentulous patients despite their concomitant diseases. Describing our clinical case and experience in the treatment with modern dental implants with hydrophilic surface, we found that with proper consultations and premedication of patients

with compromised medical status, the success of treatment is high and the quality of life of the patient is improved.

REFERENCES

1. Vasak C, Busenlechner D, Schwarze UY, et al. Early bone apposition to hydrophilic and hydrophobic titanium implant surfaces: a histologic and histomorphometric study in minipigs. *Clin Oral Impl Res* 2014; 25(12):1378–85.
2. Bataineh, K, Al Janaideh, M. Effect of different biocompatible implant materials on the mechanical stability of dental implants under excessive oblique load. *Clin Implant Dent Relat Res* 2019; 21(6):1206–17.
3. Gallucci GO, Hamilton A, Zhou W, et al. Implant placement and loading protocols in partially edentulous patients: A systematic review. *Clin Oral Impl Res* 2018; 29(Suppl. 16):106–34.
4. Kwon TG, Lee CO, Park JW, et al. Osteonecrosis associated with dental implants in patients undergoing bisphosphonate treatment. *Clin Oral Implants Res* 2014; 25(5):632–40.
5. Lang NP, Salvi GE, Huynh-Ba G, et al. Early osseointegration to hydrophilic and hydrophobic implant surfaces in humans. *Clin Oral Impl Res* 2011; 22:349–56.
6. Temmerman A, Rasmusson L, Kubler A, et al. An open, prospective, non-randomized, controlled, multicentre study to evaluate the clinical outcome of implant treatment in women over 60 years of age with osteoporosis/osteopenia: 1-year results. *Clin Oral Implants Res* 2017; 28:95–102.
7. De Medeiros FCFL, Kudo GAH, Leme BG, et al. Dental implants in patients with osteoporosis: a systematic review with meta-analysis. *Int J Oral Maxillofac Surg* 2018; 47(4):480–91.
8. Lee WC, Guntur AR, Long F, et al. Energy metabolism of the osteoblast: implications for osteoporosis. *Endocr Rev* 2017; 38(3):255–66.
9. Gupta S, Sabharwal R, Nazeer J, et al. Platform switching technique and crestal bone loss around the dental implants: A systematic review. *Ann Afr Med* 2019; 18(1):1–6.
10. Atieh MA, Ibrahim HM, Atieh AH. Platform switching for marginal bone preservation around dental implants: a systematic review and meta-analysis. *J Periodontol* 2010; 81(10):1350–66.
11. Holahan CM, Koka S, Kennel KA, et al. Effect of osteoporotic status on the survival of titanium dental implants. *Int J Oral Maxillofac Implants* 2008; 23(5):905–10.
12. Giovannacci I, Meleti M, Manfredi M, et al. Medication-related osteonecrosis of the jaw around dental implants: implant surgery-triggered or implant presence-triggered osteonecrosis? *J Craniofac Surg* 2016; 27(3):697–701.
13. Daubert DM, Weinstein BF, Bordin S, et al. Prevalence and predictive factors for peri-implant disease and implant failure: a cross-sectional analysis. *J Periodontol* 2015; 86(3):337–47.
14. Tabrizi R, Behnia H, Taherian S, et al. What are the incidence and factors associated with implant fracture? *J Oral Maxillofac Surg* 2017; 75(9):1866–72.
15. Marchand F, Raskin A, Dionnes-Hornes A, et al. Dental implants and diabetes: conditions for success. *Diabetes Metab* 2012; 38(1):14–9.
16. Verhulst MJL, Loos BG, Gerdes VEA, et al. Evaluating all potential oral complications of diabetes mellitus. *Front Endocrinol (Lausanne)* 2019; 10:56.
17. Farzad P, Andersson L, Nyberg J. Dental implant treatment in diabetic patients. *Implant Dent* 2002; 11(3):262–7.
18. Shi Q, Xu J, Zhang T, et al. Post-operative bleeding risk in dental surgery for patients on oral anticoagulant therapy: a meta-analysis of observational studies. *Front Pharmacol* 2017; 8:58.
19. de Andrade NK, Motta RHL, Bergamaschi CC, et al. Bleeding risk in patients using oral anticoagulants undergoing surgical procedures in dentistry: a systematic review and meta-analysis. *Front Pharmacol* 2019; 10:866.
20. Gómez-Moreno G, Aguilar-Salvatierra A, Fernández-Cejas E, et al. Dental implant surgery in patients in treatment with the anticoagulant oral rivaroxaban. *Clin Oral Implants Res* 2016; 27(6):730–3.
21. Gómez-de Diego R, Mang-de la Rosa M del R, Romero-Pérez MJ, et al. Indications and contraindications of dental implants in medically compromised patients: update. *Med Oral Patol Oral Cir Bucal* 2014; 19(5):e483–9.

Тотальная реабилитация полости рта с применением зубных имплантатов у пожилого пациента с сопутствующими заболеваниями: клинический случай

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Резюме

Мы сообщаем о случае восстановления жевательных и голосовых функций у пожилого пациента с сопутствующими заболеваниями, который принимает системные лекарства и имеет недостаточный объём кости для установки имплантатов в правильное положение. На рентгенограмме выявлена выраженная асимметричная атрофия нижней челюсти, особенно с правой стороны, что повлияло на расположение нижнечелюстного канала. Это сильно ограничивает и затрудняет восстановление жевательных и фонетических функций обычными протезами. Адекватный медицинский контроль и долгосрочное наблюдение за заболеванием пациента позволяет проводить безопасные операции по удалению зубов и установке внутрикостных имплантатов в кости челюсти.

Ключевые слова

сопутствующие заболевания, зубные имплантаты, гидрофильный, оральная реабилитация
