

Rehabilitation of edentulous maxilla with implant-supported fixed prosthesis: a case report

Abstract / Introduction: Functional, esthetic and psychological issues arising from edentulism have led to a growing search for oral rehabilitation with implant-supported prostheses. Due to the anatomy of this region, this type of rehabilitation requires detailed planning, especially when treating edentulous maxilla with implant-supported fixed prostheses. **Objective:** The aim of this case report is to describe the rehabilitation of an edentulous maxilla with implant-supported complete fixed denture of which framework received metal-ceramic elements individually cemented. **Keywords:** Complete denture. Dental implants. Maxilla.

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How to cite this article: Bergamo ETP, Barbi FCL, Farahr GJ, Celestrino M, Pereira JR, Melo MP. Rehabilitation of edentulous maxilla with implant-supported fixed prosthesis: a case report. Dental Press Implantol. 2014 Oct-Dec;8(4):16-26. doi: <http://dx.doi.org/10.14436/2237-650X.8.4.016-026.oar>

Submitted: August 25, 2014 - **Revised and accepted:** September 10, 2014

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» The authors report no commercial, proprietary or financial interest in the products or companies described in this article.

» Patients displayed in this article previously approved the use of their facial and intraoral photographs.

INTRODUCTION

Edentulism has been often associated with functional, esthetic and psychological issues, and can affect one's daily activities as well as quality of life.¹ Technological advance has led to greater access to information and difficulty adapting to removable dentures. As a result, edentulous patients rehabilitation has been increasingly requested. Osseointegrated implants have been reported in association with good predictability. Astrand et al,² in 2008, followed up patients for 20 years and reported a survival rate of 99.2% for implants and 100% for prosthetic stability with little complications.

It is paramount to identify patient's expectations; however, deciding which prosthesis model will be used is not only based on patient's desires or financial conditions, especially in cases of upper arch reconstruction of which peculiarities surpass those of the lower arch. Detailed treatment planning should be conducted taking the following into account: anatomy of the maxilla, bone resorption pattern, quality of bone available for implant placement, emergence profile development, maxillary function at speaking, and esthetics.^{3,4,5} The fixed denture model of choice guides implant positioning, while placement guides the denture model according to anatomy.¹ Implant-supported fixed prosthesis can be combined or segmented, and it is usually made of noble or common metal alloy. Acrylic and porcelain are the most indicated for coverage. Additionally, based on patient's individual clinical conditions, acrylic or porcelain-made artificial gingiva might be recommended.⁵ Hence, the aim of this case report is to describe the rehabilitation of an edentulous maxilla with

metal-ceramic complete fixed denture and acrylic resin artificial gingiva, of which framework received metal-ceramic elements individually cemented.

A CASE REPORT

A male patient sought treatment at State University of Maringá (UEM) dental clinic. He questioned about his upper teeth clinical conditions and reported history of periodontal disease. The patient had a removable partial denture in his upper arch and was dissatisfied with it. For this reason, his expectation was to have osseointegrated implant fixed rehabilitation carried out. The first interview as well as clinical and radiographic examinations were performed. Dental casts were also obtained for diagnosis and treatment planning.

Hence, a multidisciplinary team planned extraction of remaining teeth in order to allow rehabilitation with implant-supported complete one-piece upper denture with single metal-ceramic elements and acrylic artificial gingiva due to atrophic maxilla and loss of lip support.

Once surgical procedures and osseointegration were concluded, the prosthetic rehabilitation phase was initiated (Figs 1 to 4).

Impression with open tray and addition silicone (Futura AD, DFL, Jacarepaguá/RJ — Brazil) was carried out for both arches. Subsequently, maxillomandibular records were conventionally obtained with a base plaque and wax guide plane in order to establish patient's vertical dimension used to fabricate the waxing and a fixed temporary denture with metallic reinforcement (Fig 5).

The temporary denture was used as a guide for the permanent one. To this end, the former was used to set up a semi adjustable

articulator and to aid anterior guide record taking, in addition to being used at the moment of occlusal adjustment and porcelain application. A silicone matrix (Zetalabor, Zhermach SpA, Badia Polesine, Italy) was

prepared to aid the laboratory technician to prepare the metallic structure (Figs 6 and 7).

The latter was manufactured so as to simulate single tooth preparation in which metal-ceramic elements were individually cemented.



Figure 1. Frontal third at prosthetic phase onset. The patient was using immediate complete denture manufactured at surgical treatment onset.



Figure 2. Intraoral view at prosthetic phase onset with temporary denture properly placed.



Figure 3. Intraoral view at prosthetic phase onset without temporary denture.



Figure 4. Upper intraoral view at prosthetic phase onset without temporary denture.



Figure 5. Fixed temporary denture.



Figure 6. Fixed temporary denture used as a guide for mounting models in an articulator. The same parameters used for permanent denture manufacture were followed.

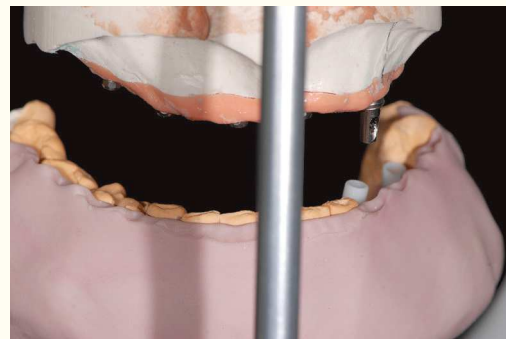


Figure 7. Space available for permanent structure manufacture.

This decision was based on easy repair, should that be necessary. The material of choice was nickel-chromium (Wiron 99, Bego, Bremen, Germany), also used for single metal-ceramic crown copings to which coverage ceramic Ex3 was applied (Noritake, Tokyo, Japan). At this point, the patient tried the metal structure on so as to assess whether it fit (Fig 8).

Subsequently, the artificial gingiva was attached to the metal structure for esthetic fitting in mouth (Fig 9).

The metal-ceramic crowns were cemented in laboratory using resin cement according to the manufacturer's instructions (Multilink, Ivoclar Vivadent, Barueri/SP – Brazil) (Figs 10, 11 and 12).

The final prosthesis was installed and, a week later, final torque and sealing of screw sites with composite resin (IPS Empress Direct, Ivoclar Vivadent) were carried out.

Follow-up sessions were conducted for two months for potential adjustments. The patient was advised about oral hygiene and prosthetic appliance upkeep. Rehabilitation follow-up lasted for a year and no complications were identified (Fig 17).

DISCUSSION

Rehabilitation of edentulous patients should be performed uniquely and avoid generalization of techniques, especially when faced with a wide range of alternatives



Figure 8. Patient trying the one-piece structure with individual crowns.



Figure 9. Patient trying the one-piece structure with individual crowns.



Figure 10. Cementation with resin cement (Multilink, Ivoclar Vivadent).

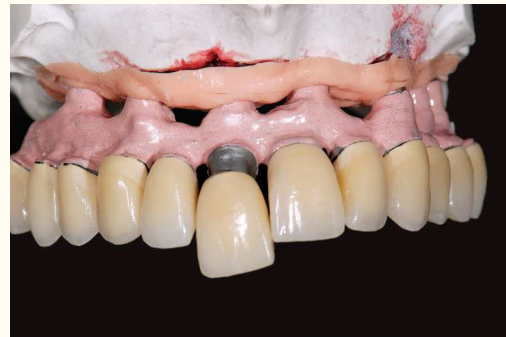


Figure 11. Metal-ceramic elements to be individually cemented.



Figure 12. Cementation phase concluded.



Figure 13. Denture concluded.



Figure 14. Denture concluded.



Figure 15. Denture concluded and installed.



Figure 16. Closed-up view of denture concluded and installed.

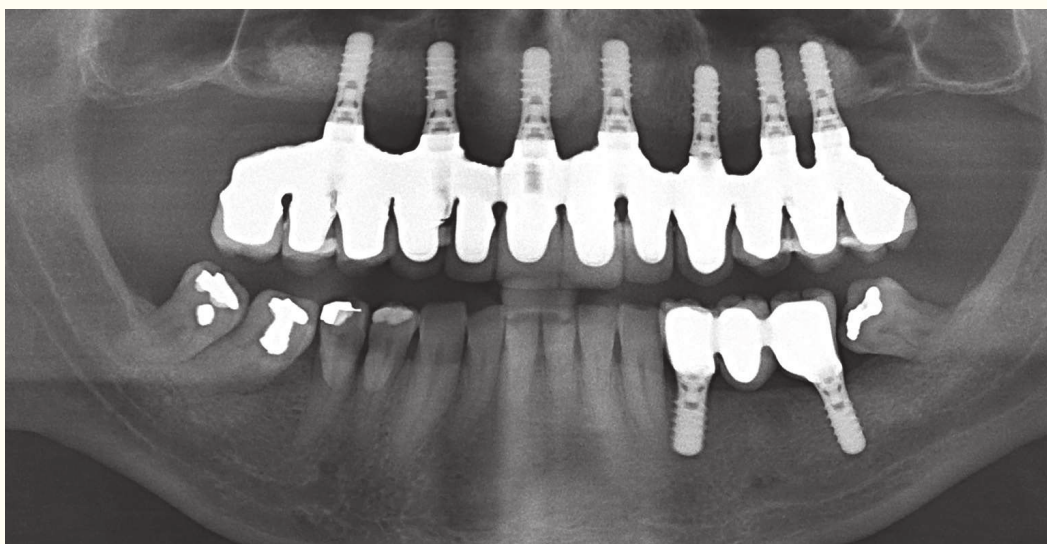


Figure 17. Panoramic radiograph after one-year follow-up.

and different anatomic conditions, as it is the case of the maxilla.³ Hence, judicious planning, including dental casts mounted in an articulator, diagnostic waxing and clinical as well as radiographic examinations, proves imperative. Detailed treatment planning should be conducted taking the following into account: anatomy of the maxilla, bone resorption pattern, quality of bone available for implant placement, emergence profile development, maxillary function at speaking, and esthetics.^{3,4,5} In addition, access to hygiene, easy prosthesis repair and patient's economic resources should also be considered.¹ In cases of fixed rehabilitation, the number and position of implants determine which type of prosthesis will be used. Likewise, the prosthesis model of choice guides the number and position of implants in the arch. Both requirements are based on the anatomic and morphological conditions of the maxilla and are directly associated with maxillary prosthesis clinical success, as demonstrated by studies with 1 to 15-year follow-ups.⁶ Individuals with significant bone resorption and low smile line might be referred to conventional fixed denture rehabilitation screwed with artificial gingiva, in which case lip support assessment is paramount, as it determines necessary acrylic gingival contour. However, the process should

not hinder hygiene.⁵ Patients with significant loss of support and hindered hygiene conditions may opt for detachable artificial gingiva.^{7,8} Implant-supported fixed complete denture success rate^{2,6,9,10,11} is higher than 90%.

In the case reported herein, the one-piece model associated with artificial gingiva was chosen due to the severity of maxillary bone resorption. A structure with metal-ceramic elements individually cemented was chosen based on the technical criterion that predictability is higher when porcelain is individually applied when a one-piece is used. Additionally, smaller pieces are less affected by the difference in thermal contraction occurring in the metal-ceramic interface, which also depends on the difference between thermal expansion coefficients and may lead to potential cracks.¹³ Furthermore, the technique reported herein provides ease for repair, as the damaged element will be replaced alone, instead of involving the entire set.¹⁴

CONCLUSION

The case reported in this article described the use of a one-piece structure that allowed metal-ceramic elements to be individually cemented. Its use is justified by the indicator of reversibility.

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