Case report. Full arch implant rehabilitation

David Garcia Baeza
Private Practice, Madrid, Spain.

Correspondence to: Dr David Garcia Baeza. CIMA dental. Laguna Grande 4. 28034 Madrid. Spain.
email: clinica@cimadental.es
Abstract

An implant-supported restoration treatment is a good alternative to conventional full prostheses for patients with edentulism. This treatment has been performed successfully in recent years and constitutes a high-value clinical reality. This article reports the clinical case of a male patient whose lower jaw rehabilitation was done with a hybrid prosthesis on six implants. The following is a step-by-step description of the implant-supported prosthesis treatment that was performed, restoring the patient's esthetics and functionality, and thereby improving his quality of life.

KEYWORDS: Implant-supported restoration, hybrid prosthesis, dental implant, full arch rehabilitation.
Introduction

Oral implantology has undergone great advances in recent years, as it allows lost teeth to be replaced with a high degree of satisfaction at functional and esthetic levels. A partial or total loss of teeth not only affects facial esthetics but also functions as vital as chewing and phonation. We can perform prosthodontic rehabilitation with a high success rate for this type of patient.

The prosthetic options for rehabilitating an edentulous patient with dental implants are divided into two categories: fixed and removable restorations (1).

A hybrid prosthesis consists of a cast metal framework covered by acrylic, which supports artificial fixed teeth. The original design of the hybrid prosthesis (fixed-removable) was developed by Swedish researchers using the two-stage endosseous implant system developed by Branemark. The prosthesis consisted of a gold alloy framework attached to the copings of the implants, and on this framework conventional acrylic resin denture teeth were secured with acrylic resin (2).

The factors that determine the type of implant-supported restoration for a complete edentulous patient is the amount of space from the bone to the occlusal plane (prosthetic space) and the lip support. The prosthetic space needed for a hybrid prosthesis is 11 mm minimum and 15 mm maximum, with a lip support given by the bone structures. When less space is available (10 mm) and there is lip support, a porcelain-to-metal restoration is suggested. When there is more than 15 mm of prosthetic space and absence of lip support, a type of implant-supported overdenture restoration is recommended, which will give that lip support not provided by the bony structures of the patient (1).
Zarb et al described the treatment of severely reabsorbed complete edentulous maxillae with a hybrid prosthesis using a metallic structure with acrylic and artificial teeth, with prosthetic spaces larger than 15mm (3).

An incorrect adaptation between metal structures and implants can cause bone loss and failure of osseointegration, and this is clinically decisive. It is generally accepted in literature that the passive settlement of a prosthesis is required for maintenance and long-term success of an implant treatment. In addition, the literature has implied that incorrect adaptation of metal structures is a decisive and significant factor causing mechanical and biological complications. The loosening of both the prosthesis and the abutment screws and even the fracture of different system components have been attributed to the lack of adjustment and adaptation of the prosthesis.

The purpose of this article is to present the report of a clinical case of a complete edentulous patient in the upper and lower jaw, who received treatment with implants and placement of a lower hybrid prosthesis, and to show the step-by-step preparation process of that prosthesis.
Case report.

A 68-year-old patient presented to our facility with a complete upper mucosal-supported denture, with which he was relatively comfortable, and had all his original teeth on the lower arch, but with a very advanced periodontal disease which had caused him a loss of support of more than 80%; these teeth presented class II and III mobility, which made it very difficult to chew.

The proposed treatment plan for the patient was to extract the lower teeth and rehabilitate the lower arch using implants and a fixed prosthesis to maintain the same feeling as with his natural teeth, and for the upper arch to replace the full denture.

Normally, when teeth are extracted from a complete arch and an immediate restoration is placed, it creates a problem of adaptation for the
patient, especially in the lower arch area. To help the patient during this period of healing and osseointegration of the implants, it is a good idea to place two provisional implants.

Once the extractions were healed, 6 Aadva Tapped 4x10 mm implants were placed, in position of molars, first bicuspids and anterior incisors.

The bone quality and quantity were good, and once the expected osseointegration time had passed, transitional abutments were placed. In this case, two abutment diameters were used, narrower (SR Abutment 3.8 x 2 mm) for the incisor and bicuspid areas where there is less inserted gum tissue and wider (SR Abutment 4.3 x 2 mm) in the posterior area.
After this second phase, there was a waiting period for the tissues to mature before beginning with the prosthetic phase. For this, an impression was taken with closed tray copings, which is very simple but does not give a very exact model, which then was used to make a rigid impression tray that was made of metal and was secured with plaster to only one of the implants.
Once placed in the mouth, open tray copings were then used and they were splinted to the structure with a special plaster mixture; once this is hardened, everything was registered with a VPS impression. This technique gives a very reliable master cast, so a very good structure fit can be ensured.

Once the final model with the different analogs was ready, the planning started.

First, the old complete upper denture was analyzed, in this type of cases it is very useful to do a lateral analysis, so for that photos and X-rays were taken, something that differentiates our technique from other dentists’ is that a narrow lead foil strip is placed on the upper and lower central incisor. With this, there is extra information to see the relationship between the position of the anterior teeth and the bone.

With the lateral X-rays, the situation of the transitional abutments can be seen; this is very important since all
the manipulation from the different tests that need to be done will be carried out far from the head of the implant.

Once the fulcrum point was analyzed and the inclination of the upper incisor for lip support is the wright moment to start designing the new
upper arch, giving the patient a new occlusal plane and a new incisor position. The Fox plane helped us to obtain the correct plane and then we used the Kois Bow for the cranial-maxillar reference.

Once the models were placed in the articulator and the parameters were taken from the patient, the laboratory technician began to make a set of test teeth in wax both for the upper and lower arches so the correct fit could be assessed, including the patient’s occlusion and esthetics.
As the images show, the upper arch is narrower than the lower one because those teeth were lost much earlier, which means that for a correct functioning of the complete upper prosthesis while chewing, the posterior sectors should be placed at a crossbite, this way the axis of force when chewing food will fall on the alveolar process and will not displace the prosthesis.

Once confirmed that everything worked properly, the next step was constructing the metal structure that would be closely linked to the wax tooth design. This was once again checked with the teeth in position to give a last confirmation before the final manufacturing. At that time, confirmation of the modifications made could be carried out again by using the lead foil strip, as well as confirmation of the occlusion in case there was any type of variation.
That was the moment when the final prostheses were made; the upper one was made as wide as possible in the posterior area so that it would be as stable as possible, and the lower one was placed on implants. A confirmation and small adjustments had to be made in the mouth to counterbalance the small misalignments that normally happen in manufacturing.

**DISCUSSION**

The treatment of a complete edentulous patient using oral rehabilitation on implants begins by discussing treatment expectations and a correct clinical evaluation by performing a meticulous intraoral and extraoral examination, following a work plan to help in the diagnosis that includes studying images and X-rays, which have evolved remarkably in recent times, using models on a semi-adjustable articulator and
following protocol for the design of the proper prosthetic rehabilitation on implants, choosing from overdentures, hybrid prostheses or fixed prostheses. The choice will depend on what the dentist plans using a multifunctional guide: tomographic/surgical/prosthetic for implant placement and a suitable type of oral rehabilitation.

Rehabilitation with implant-supported hybrid prostheses is a fixed treatment on completely edentulous jaws where the prosthetic space is 11 mm or 15 mm (3), but where the need for a lip support for prosthetic rehabilitation is not a determining factor (10).
Implant-supported hybrid prosthesis can be a questionable alternative treatment procedure when a fixed restoration of porcelain metal does not meet a patient's requirements for esthetics, good phonetics, proper oral hygiene and oral comfort (11, 12). Brida et al propose an edentulous patient classification system for using implant-supported fixed prosthesis, classifying them into four types according to the following factors:
a) amount of tissue loss  
b) position of the anterior teeth in relation to the location of the residual ridge  
c) lip support  
d) smile line  
e) need for prosthetic material for gingiva color (pink acrylic)  

Class I includes patients who require gingiva-colored prosthetic material such as pink acrylic to obtain esthetic tooth proportions and optimal prosthesis contour, providing an adequate lip support.  
Class II is for patients who require pink acrylic only to obtain esthetic tooth proportions and for prosthesis contour. Lip support is not a consideration since the difference in lip projection with and without any prosthesis is generally insignificant.  
Class III contains patients who do not require gingiva-colored prosthetic material.  
Class IV is assigned to patients who may or may not require pink acrylic, depending on the result obtained after surgical intervention (10).
Following this classification, the patient from this report is in class II. Fabrication of hybrid dentures, in patients with adequate interocclusal space, provides the dentist with several advantages regarding the esthetic appearance, including replacement and decrease of soft tissue support in the bulkiness of metal substructure and in the height of crowns compared to the metal supported porcelain prosthesis. In addition to these esthetic advantages, hybrid prostheses work as shock absorbers, reducing load forces on implants (13).

The success rate of implanted-supported hybrid prosthesis treatments is high, as demonstrated by a systematic review published in 2014, which included 18 studies for evaluation, high survival rates were found (5 to 10 years) from 93.3% to 100% for the prostheses and from 87.9% to 100% for the implants (14).

In a retrospective study where the main complications after rehabilitation with an implant supported hybrid prosthesis were evaluated, it was observed that the
main complication was mucositis that affected 24% of cases, followed by problems with the prosthetic screws in 13.7% of the cases, including, for example, thread wear or loss, and with the same frequency (13.7%) fracture of the prosthesis teeth or prosthesis detachment. These problems were related to an incorrect record of vertical dimension, an inadequate occlusion or lack of passive adjustment of the metallic structure. Another problem encountered was the access to the entrance holes of the prosthetic screws (7.8%) (15).

CONCLUSIONS

Making a lower jaw hybrid restoration is a good option for rehabilitation of edentulous maxilla, and it should be included in the treatment options when evaluating a patient as it improves esthetics, functionality, and proprioception; it is easy to clean, requires less prosthetic maintenance, can be removed at any time and repaired at a very low price.
References