By Dr David García Baeza, Spain

An implant-supported restoration is a good alternative to conventional complete prostheses for patients with edentulism. This treatment has been performed successfully in recent years and constitutes a high-value clinical reality.

Oral implantology has undergone great advances in recent years, as it allows lost teeth to be replaced with a high degree of satisfaction on the functional and aesthetic level. A partial or total loss of teeth affects not only facial aesthetics but also vital functions, like chewing and phonation. A prosthodontic rehabilitation with a high success rate can be obtained 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.

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 Per-Ingvar 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.

The factors that determine the type of implant-supported restoration for a completely edentulous patient are 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 a minimum of 1mm and a maximum of 5mm, with lip support given by the bone structures. When a space of 5mm or less is available and there is lip support, a porcelain-to-metal restoration is suggested. When there is more than 5mm of prosthetic space and absence of lip support, a type of implant-supported overdenture restoration is recommended, which will give the lip support not provided by the bony structures of the patient.

Cox and Zarb described the treatment of severely resorbed completely edentulous maxillae with a hybrid prosthesis using a metal-based structure with acrylic and artificial teeth, with prosthetic spaces larger than 5mm. In this case, two abutment diameters were used, narrower (SR Abutment of 3.8 x 2.0 mm) and wider (SR Abutment of 4.5 x 2.0 mm) in the posterior area. To expedite healing and osseointegration of the implants, it is recommended to place two provisional implants.

Once the extractions had healed, six Astra tapered implants (GC Tech Europe) of 4mm in diameter and 10mm in length were placed in the position of the molars, first premolars, and central 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 of 3.8 x 2.0 mm), GC Tech Europe for the incisal and premolar areas, where there was less inserted gingival tissue, and wider (SR Abutment of 4.5 x 2.0 mm) in the posterior area.

Before beginning with the prosthetic phase, there was a waiting period for the tissue to mature. For this, an impression was taken with closed-tray copings, which is very simple, but does not give a very exact model. This was subsequently used to make a rigid impression tray that was made of metal and was secured with plaster to only one of the implants.

Once the rigid impression tray was placed in the mouth, open-tray copings were then used and they were splinted to the structure with a special plaster mixture, once this had hardened, everything was registered with a polyvinylsiloxane impression. This technique yields a very reliable master cast, ensuring a very good structure fit.

An 88-year-old patient presented to our facility with a completely maxillary mucosa-supported denture, with which he was relatively comfortable. He had all of his original teeth on the lower arch, but with very advanced periodontal disease, which had caused him a loss of support of more than 80 per cent. These teeth presented with Class II and III mobility, which made it very difficult to place.

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

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 mandibular area. To help the patient during this period of healing and osseointegration of the implants, it is recommended to place two provisional implants.

Fig. 1. Frontal view of the initial patient situation.
Fig. 2. Intraoral view of the initial situation.
Fig. 3a & b. After extractions: a) Frontal and b) occlusal view.
Fig. 4a & b. Healing abutments: a) Frontal and b) occlusal view.
Fig. 5: SR Abutments at gingival level.
Fig. 6. Impression taking with closed tray copings.
Fig. 7. Preliminary impression.
Fig. 8. Rigid metal tray impression taking. Fixing with plaster.
Fig. 9. First step of final impression taking.
Fig. 10. Final impression.
Fig. 11. Master model.
Discussion

The treatment of a completely edentulous patient with an oral restoration begins by discussing treatment expectations, followed by an accurate clinical evaluation. Thus, a detailed intraoral and extraoral examination are performed following a work plan to help in the diagnosis. This includes studying patient photography and radiographs, which have evolved remarkably in recent times, using models on a semi-adjustable articulator and following the protocol for the design of a proper prosthetic restoration on implants, choosing from overdentures, hybrid, 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 restoration.

Rehabilitation with implant-supported hybrid prostheses is a fixed treatment in completely edentulous jaws where the prosthetic space is 11mm or 15mm, but where the need for lip support for prosthetic restoration is not a determining factor. An implant-supported hybrid prosthesis can be a questionable alternative treatment when a fixed restoration of porcelain and metal does not meet the patient’s requirements for aesthetics, good phonetics, proper oral hygiene, and oral comfort.

Bidra and Agar proposed a classification system for edentulous patients for using implant-supported fixed prostheses, classifying them into four classes according to the following factors:

1. amount of tissue loss;
2. position of the anterior teeth in relation to the location of the residual ridge;
3. lip support;
4. smile line; and
5. need for prosthetic material for gingival colouring (pink acrylic).4

Class I includes patients who require gingiva-coloured prosthetic material such as pink acrylic to obtain aesthetic tooth proportions and optimal prosthetic contouring to attain adequate lip support. Class II patients require pink acrylic only to obtain aesthetic tooth proportions and for prosthetic contouring, lip support is not a consideration, since the difference in lip projection with or without any prosthetics is generally insignificant. Class III contains patients who do not require gingiva-coloured prosthetic material. Class IV is assigned to patients who may or may not require pink acrylic, depending on the result obtained after surgical interventions. Following this classification, the patient in this report was determined as Class II.

Once confirmed that everything worked properly, the next step was constructing the metal structure that would be closely linked to the wax tooth design (Figs. 20 & 21). This was once again checked with the teeth in position to give a final 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 variation (Fig. 22).

Subsequently, the final prostheses were made. The maxillary one was made as wide as possible in the posterior area so that it would be as stable as possible, and the mandibular one was placed on implants. Confirmation and small adjustments had to be performed in the mouth to counterbalance the small misalignments that normally occur in manufacturing (Figs. 23–25).

Discussion

The treatment of a completely edentulous patient with an oral restoration begins by discussing treatment expectations, followed by an accurate clinical evaluation. Thus, a detailed intraoral and extraoral examination are performed following a work plan to help in the diagnosis. This includes studying patient photography and radiographs, which have evolved remarkably in recent times, using models on a semi-adjustable articulator and following the protocol for the design of a proper prosthetic restoration on implants, choosing from overdentures, hybrid, 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 restoration.

Rehabilitation with implant-supported hybrid prostheses is a fixed treatment in completely edentulous jaws where the prosthetic space is 11mm or 15mm, but where the need for lip support for prosthetic restoration is not a determining factor. An implant-supported hybrid prosthesis can be a questionable alternative treatment when a fixed restoration of porcelain and metal does not meet the patient’s requirements for aesthetics, good phonetics, proper oral hygiene, and oral comfort. Bidra and Agar proposed a classification system for edentulous patients for using implant-supported fixed prostheses, classifying them into four classes according to the following factors:

1. amount of tissue loss;
2. position of the anterior teeth in relation to the location of the residual ridge;
3. lip support;
4. smile line; and
5. need for prosthetic material for gingival colouring (pink acrylic).

Class I includes patients who require gingiva-coloured prosthetic material such as pink acrylic to obtain aesthetic tooth proportions and optimal prosthetic contouring to attain adequate lip support. Class II patients require pink acrylic only to obtain aesthetic tooth proportions and for prosthetic contouring, lip support is not a consideration, since the difference in lip projection with or without any prosthetics is generally insignificant. Class III contains patients who do not require gingiva-coloured prosthetic material. Class IV is assigned to patients who may or may not require pink acrylic, depending on the result obtained after surgical interventions following this classification, the patient in this report was determined as Class II.

Once confirmed that everything worked properly, the next step was constructing the metal structure that would be closely linked to the wax tooth design (Figs. 20 & 21). This was once again checked with the teeth in position to give a final 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 variation (Fig. 22).

Subsequently, the final prostheses were made. The maxillary one was made as wide as possible in the posterior area so that it would be as stable as possible, and the mandibular one was placed on implants. Confirmation and small adjustments had to be performed in the mouth to counterbalance the small misalignments that normally occur in manufacturing (Figs. 23–25).
Delivering innovation, digital solutions and versatility—the Astra Tech Implant System evolution continues...

By Dentsply Sirona Implants

Dentsply Sirona Implants continues to deliver innovation, digital solutions and versatility in implant dentistry. With the latest product developments, the Astra Tech Implant System continues to evolve, based on customer needs and the latest digital technology.

With a comprehensive product and solutions portfolio for all phases of implant dentistry, Dentsply Sirona Implants continually strives to increase the application of implant therapy, based on science and without compromising safety and efficacy.

"The implant solutions that we develop are based on the needs of our customers, as well as centered around our well-documented and clinically proven implant systems. We’re all about providing long-term functional and aesthetic solutions for the many different situations that happen in clinics and laboratories every day all over the world. And we help dental professionals deliver the absolute best care for their patients," says Gene Dorff, Group Vice President at Dentsply Sirona Implants.

Astra Tech Implant System Osseotpeed implants show excellent clinical results, as described in the article by Windael et al. ** Patients in this study received a total of 105 immediately loaded implants in the North American market. In 2019 and in the European market in early 2020.

Azento for single tooth replacement

Azento is the latest innovation in the Dentsply Sirona Implants’ implant solutions portfolio, helping implant dentistry professionals with one of their most common indications—single tooth replacement—in implant therapy.

Each patient treated with Azento gets a custom treatment plan, including surgical guides, instruments, drills, a case-specific Astra Tech Implant System or Xive implant, an Astra Tech Implant System Osseotpeed implant or Xive implant, and an optional temporary restoration.

This digital implant workflow solution streamlines the implant planning, purchasing and delivery of products. For the clinician, this custom implant solution increases convenience, seamlessly and efficiently connects with qualified laboratories, and enables consistent, excellent results for patients.

Introducing Astra Tech Implant EV

The Astra Tech Implant System just got even better with the new Astra Tech Implant EV. As one of the most well-documented implant systems in the market today—documented in over 1,000 publications in peer-reviewed journals—it continues to evolve and provide great clinical benefits.

In fact, the revised implant design change comes with significant advantages—with a deeper implant thread design apically, it is easier to reach preferred primary stability and the handling experience is enhanced for easy installation.

Dr. Mark Ludlow, Division Director of Implant Prosthodontics and Associate Professor at the College of Dental Medicine at the Medical University of South Carolina, agrees: "You still have all the wonderful properties of TX and EV, but with this new implant, you get better handling that helps hit that primary stability—it literally just sinks into the osteotomy."

With this new change in design properties also comes the new name—Astra Tech Implant EV. The new implant line will be available starting in 2020.
Astra Tech Implant System®

Simplicity without compromise

The design philosophy of the Astra Tech Implant System EV is based on the natural dentition and supported by flexible surgical protocol and a simple prosthetic workflow for increased confidence and satisfaction for all members of the treatment team.

- Unique interface with one-position-only placement for Atlantis patient-specific abutments
- Self-guiding impression components
- Versatile implant designs
- Flexible drilling protocol

The foundation of this evolutionary step remains the unique Astra Tech Implant System BioManagement Complex.

www.dentsplysirona.com

Dentsply Sirona Implants

Fig. 3: Astra Tech implant System provides surgical and prosthetic flexibility, maintains marginal bone level, and delivers reliable and predictable clinical results as well as natural aesthetics in the short and long term.