Implant-prosthetic restorations
The challenge of creating an aesthetically pleasing smile in an edentulous patient

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Rehabilitation of the edentulous jaw can be achieved with various treatment modalities. Removable implant-supported overdentures can provide a comfortable, aesthetic and functional option even in cases in which only a limited number of implants can be used. Since the number of patients desiring an alternative to complete dentures is on the rise, this treatment option is becoming a frequent choice.

Patients’ expectations regarding prosthetic tooth replacements are similarly high compared with fixed ceramic veneered restorations. With the emergence of new materials and their combination with CAD/CAM technology, outstanding clinical outcomes can be achieved for this indication. An adequate solution can be found for almost every patient and budget.

Generally, overdentures offer several advantages over conventional removable prostheses, including improved stability, functionality, comfort, confidence in the ability to interact socially, straight forward rehabilitation and easy maintenance for the patient. Quite simply, overdentures result in a significant improvement in the quality of life of the patient.

In our case, a 58-year-old patient presented at the practice with discomfort caused by her complete maxillary denture. When looking at her history, we found a prosthetic restoration retained on six implants in the lower jaw and a complete maxillary denture that was aesthetically and functionally inadequate (Fig. 1). An initial aesthetic evaluation established that the shape and shade of the teeth were inappropriate. In addition, the midline was misaligned and the curvature of the maxillary anterior teeth was shaped incorrectly.

The poor stability of the denture was caused by insufficient prosthetic support and by the method with which it had been produced. Taking the patient’s requirements and financial constraints, as well as the clinical condition of the maxillary prosthetic field, into account, we decided in favour of an implant-supported prosthetic treatment modality. The plan was to insert four maxillary implants to retain an overdenture prosthesis using the double-crown method. This procedure is frequently followed in such cases and has seen constant improvement with the emergence of new technologies and materials.

Our protocol required primary telescopic crowns milled from zirconia at an incline of two degrees and secondary copings obtained by electroforming. This approach combines the advantages of zirconia (primary telescopes) with those of hydraulic retention (galvanic copings). After a complication-free period of healing and osseointegration, the four implants were uncovered and a preliminary impression was taken. Also, a customised tray was created from the resulting model.

In order to proceed to the next stage of the treatment, we required a functional impression that would transfer the exact position of the implants. For this purpose, the four impression posts were splinted together on a custom tray with composite material (Figs. 2 & 3). The plan was to insert four maxillary implants to retain an overdenture prosthesis using the double-crown method. This procedure is frequently followed in such cases and has seen constant improvement with the emergence of new technologies and materials.

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Once all of the relevant ratios had been obtained, the models were mounted on the articulator (Fig. 5). The difficulty of this case was that the existing mandibular restoration in the design of the maxillary rehabilitation. The implant axes of the mandibular prosthesis in particular posed some problems. Shade selection was dictated by the mandibular restoration and, consequently, our room for decision-making was reduced to deciding on the shape of the teeth. To this end, a photograph of the patient as a young adult was useful, as it was her wish that the shape and size of her teeth as they were in her youth were closely reproduced.

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Secondary structure

The primary crowns could now be prepared for manufacturing the secondary crown by means of the electroforming technique. For this purpose, the zirconia surfaces were prepared in a thin layer of wax to create the space necessary for the cement that would later be used. The primary structures were invested, cast in a cobalt-chromium alloy using induction casting technology and then finished. The tertiary structure was intra-orally cemented on to the electroformed telescopes (Multilink Hybrid Abutment and Monobond, Ivoclar Vivadent) in order to obtain a tension-free restoration (Fig. 11).

Aesthetic design

The structure obtained was covered in an opaque light-curing laboratory composite (SR Nexco, Ivoclar Vivadent) in pink and white to finish the prosthesis. Again, the silicone key was used as a guide. The Phnnares II titanium abutments were permanently bonded to the titanium abutments (Multilink Hybrid Abutment, Ivoclar Vivadent). Finally, the zirconia telescopes were adjusted using a laboratory turbine and parallellograph. The walls of the telescopes were given a 2-degree incline and smoothed using appropriate diamond grinding tools and sufficient water-cooling (Figs. 9b–10).

Tertiary structure

All of the components were repositioned on to the working model. Before the tertiary structure was fabricated, the electroformed crowns were covered in a thin layer of wax to create the space necessary for the cement that would later be used. The tertiary structure was invested, cast in a cobalt-chromium alloy using induction casting technology and then finished. The tertiary structure was intra-orally cemented on to the electroformed telescopes (Multilink Hybrid Abutment and Monobond, Ivoclar Vivadent) in order to obtain a tension-free restoration (Fig. 11).

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