

# High-tech restorations in four hours

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Implant-retained prosthetic restoration of an edentulous jaw with the SR Phonares II and IvoBase system

With composite denture teeth of the “latest generation”, the increasing esthetic expectations of patients can be fulfilled even when restoring edentulous jaws.

Hybrid dentures supported by tilted implants provide several advantages for both the clinician and patient. Conventional treatment methods use four implants to anchor the restoration. By angling the end implants, optimal use of the bone volume available can be achieved. Consequently, the need for time-consuming procedures, such as bone augmentation, can be avoided. In addition, the patient can leave the practice a few hours after the surgical intervention with a temporary restoration in place. To meet the high esthetic expectations of edentulous patients, “individuality” plays a key role in the design of the prosthetic reconstruction – composite denture teeth of the latest generation and an especially designed denture base material based on PMMA (polymethyl methacrylate) are recommended to achieve this. These materials not only lead to a natural-looking result but also meet the demand for affordable restorations.

This report focuses on an implant-retained prosthetic treatment system for the esthetic and efficient treatment of edentulous patients. Similar to other fields of dentistry, the demand for minimally invasive procedures has been increasing in dental implant indications. Patients prefer treatment options that require less time and are based on a straightforward clinical procedure. This requirement is coupled with the factor of “esthetics”. How can we combine these two aspects? “Rationalizing” the restoration of edentulous jaws is limited by the number of implants and the healing time required. In spite of this, modern implant systems and innovative prosthetic materials allow you to fabricate functional and esthetic hybrid implant restorations in a relatively short time and to discharge the previously edentulous patient with a “perfect” smile after a low-pain treatment. A well-thought-through and consistent treatment plan and collaboration with an experienced dental technician are a prerequisite for a successful outcome.

The starting point of every treatment is an accurate diagnosis based on a detailed clinical and radiographic analysis. This is followed by a face-to-face conversation to understand the patient’s expectations and to outline feasible options. Unrealistic expectations should be discouraged<sup>4</sup> at this stage.

## Patient case

A 42-year-old female patient came to our practice with a significantly reduced residual dentition in the maxillary jaw and removable dentures (Figs. 1a to d). The mandibular jaw had received an implant-supported restoration two years ago. She complained about the severe mobility of her upper dentures. Her residual dentition was very loose because of advanced periodontal disease and could no longer be saved. Furthermore, she was unhappy about the esthetic appearance of her mandibular restoration. The patient requested a fast rehabilitation without having to undergo several surgical

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Figure 1a - d: Initial situation: The upper jaw was previously restored with removable dentures. The remaining teeth were excessively loose and could no longer be saved. In the lower jaw, the patient wore a prosthesis retained by six implants.

interventions. Her esthetic expectations were high, but her financial resources were limited.

We opted for an implant-supported prosthesis. After having explored possible treatment options, we decided to forego bone grafting in the upper jaw and, instead, to proceed according to the All-on-4™ treatment concept (Nobel Biocare AB). This system consists of a titanium-based hybrid prosthesis retained by two implants in the anterior region and two angled implants in the posterior region. This process takes optimum advantage of the existing bone to provide anchorage for the implants. In the case presented here, the final prosthesis was accomplished with a CAD/CAM milled titanium framework, nano-hybrid composite teeth (SR Phonares® II) and an IvoBase® denture base. The viability of prostheses anchored by only four dental implants with limited distal cantilever has recently been discussed in the dental literature. No differences in survival rates or

marginal bone loss between axial and tilted implants have been reported.

### Surgical procedure

Intravenous sedation was administered to extract the loosened teeth atraumatically and to debride the sockets. Starting from the site of the first molar, a mid-crestal incision was laid in the keratinized gingiva and a mucoperiosteal flap was elevated. The distal implants were inserted into the posterior sinus wall at an inclination of 40 degrees to the occlusal plane. In the anterior region, the implants were placed axially in the region of the lateral incisors. Angulated multi-unit abutments were fitted over the tilted distal implants, while standard abutments were placed over the anterior implants. After the flap had been repositioned, an impression and bite registration were taken. A few hours later, a lab-fabricated temporary composite bridge was inserted.



Figure 2a - c: OPG image of the initial situation (a) and control X-rays of the temporary (b) and final restoration (c).



*Figure 3: Temporary restoration with immediate loading after insertion of the maxillary implants.*

This bridge ensured full occlusal contacts in maximum intercuspation from canine to canine and prevented any lateral excursion. Following a healing time of six months, a titanium base (NobelProcera®, Nobel Biocare AB) was manufactured for the final restoration (Figs. 2a to c).

### **Fabrication of the prosthetic restoration**

Both the temporaries (Fig. 3) and the final restorations (Figs 4a and b) were fabricated using the PMMA-based IvoBase hybrid denture base material, the IvoBase Injector and the Phonares II denture teeth. The IvoBase system combines the benefits of heat-curing and self-curing polymers. Polymerization shrinkage causes an inevitable loss of volume. With the IvoBase Injector, however, this loss is automatically compensated by the continual supply of material during the injection process. As a result, implant-supported temporary dentures ensuring a passive fit can be created without any difficulty. The surface quality and fracture resistance of this material are superior to those of other heat-curing polymers. Furthermore, the residual monomer

content of IvoBase is 1.5 per cent, which is very low, considering that the permissible threshold for self-curing polymers is 4.5 per cent and 2.2 per cent for heat-curing polymers. If the RMR (residual monomer reduction) function is selected, the residual monomer content can be reduced to below 1 per cent. In this context, it is noteworthy to mention that the percentage (11 per cent) of fractured dental prostheses occurring in our practice has dramatically decreased since we commenced using the IvoBase system.

SR Phonares II Lingual denture teeth consist of nano-hybrid composite and have been especially designed for a lingualized occlusion scheme. These teeth are characterized by high strength and excellent wear resistance. They are particularly suitable for implant-supported dentures that are exposed to high chewing forces. These teeth impart a natural looking appearance to the anterior region due to their esthetic surface texture, translucency, opalescence and fluorescence. The teeth feature an anatomically shaped base and, as a result, can be easily adjusted to the alveolar ridge. Each tooth is composed of four layers: the dentin core and facial incisal layer consist of NHC material, imparting natural esthetics and high wear resistance to the tooth. The back incisal and cervical layer comprise PMMA material to ensure an effective bond with conventional denture base materials. The NHC material is based on a highly crosslinked urethane dimethacrylate matrix, which comprises micro- and macrofillers of various types and sizes as well as PMMA clusters. The macrofillers are responsible for the high strength and colour stability of the teeth; the microfillers enhance the material's resistance to wear. The PMMA clusters embedded in the composite structure reduce the material's affinity for plaque accumulation and discolouration. A range of tooth moulds are offered to match the age and characteristics of the individual patient.



*Figure 4a, b: Final restoration: titanium bar completed with Phonares II teeth and IvoBase denture base material using an effective, straightforward fabrication process.*





Figure 5a - c: Restoration incorporated in the patient's mouth. The hybrid dentures are retained by four implants in the upper jaw and six implants in the lower jaw. The surgical procedure was kept to the minimum necessary. The final result shows a maximum of esthetics due to the prosthetic materials used.

Light-curing pastes (SR Nexco® Stains) are available to customize the individual teeth and the denture base, or pink esthetics. The result is a natural-looking prosthesis (Figs. 5a-c)

#### Aftercare

The prosthetic restoration was completed and incorporated comparatively quickly. Regular oral care at home and in the practice is fundamental to ensure the longevity of the restoration. The dental hygienist plays an essential part in this, providing regular professional cleaning and motivating the patient to conduct measures of oral care at home conscientiously.

#### Conclusion

The case described in this report shows how the dental team can provide an adequate solution for a complex case by devising a detailed treatment plan. A predictable and long-lasting result satisfying both the patient and dental team can be achieved with thorough knowledge of the materials used, an appropriate selection of components and strict adherence to the surgical and prosthetic protocols (Figs. 6a to d).

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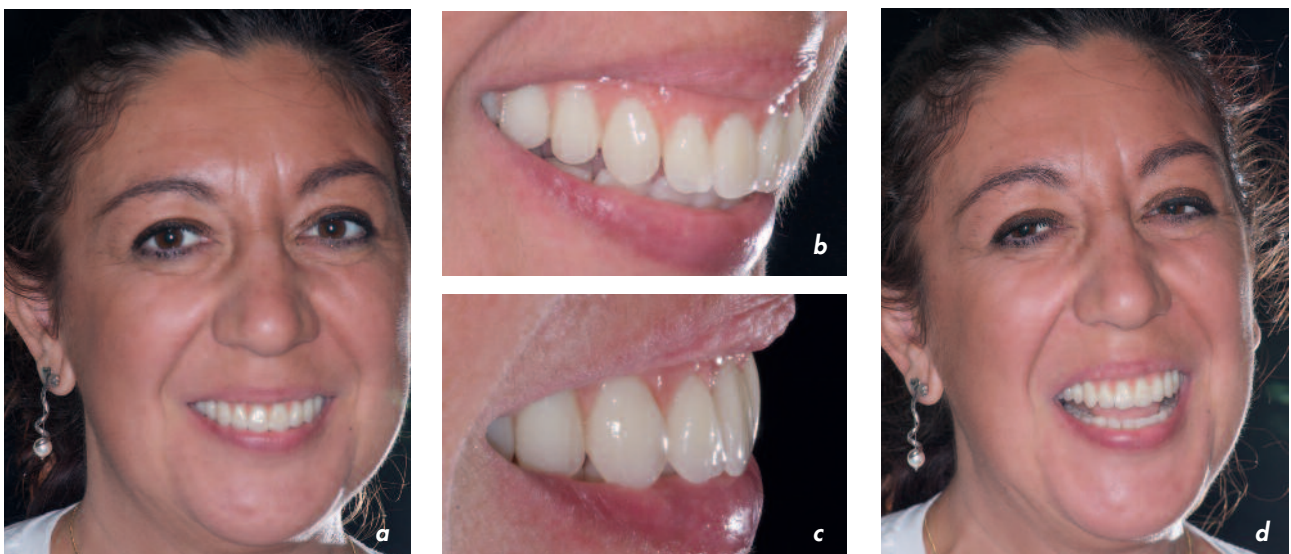


Figure 6a - d: We provided this relatively young patient with an esthetic and nearly fixed prosthetic restoration using an effective method.