LOCATOR®-RETAINED MANDIBULAR COMPLETE PROSTHESIS WITH THE ISY® IMPLANT SYSTEM IN A FEMALE PATIENT WITH EXTREME ALVEOLAR ATROPHY

Dr. Karl-Ludwig Ackermann, ZTM Gerhard Neuendorff, ZTM Christine Hammerl-Riempp, Filderstadt
The quality of life of persons with inadequately fitting mucosa-supported complete prostheses can be severely impaired. For example, they eat less often with friends as they have difficulty in chewing or are afraid that their dentures will become loose during talking or laughing [1]. For these reasons, implant-supported restorations have become established as first-line desired therapy and are also recommended by expert bodies [2, 3]. Not only do they improve function, esthetics and quality of life, they also reduce bone resorption, and as a rule, can maintain an adequate bone basis through to old age [4, 5]. However, many patients only have limited financial resources available, which do not allow elaborate restorations, for example, with bars or double crowns. Therefore, they should be offered more simple implant-supported options. An established option is a prosthesis retained with locators. This type of restoration is especially attractive with the new, extremely economical iSy® Implant System by CAMLOG. The component portfolio of the iSy Implant System is extremely reduced and simplifies processes in the dental office. It allows treatment of most standard and low-risk cases.

On behalf of the joint practice Drs. Kirsch & Ackermann, Dr. K.-L. Ackermann, MDT G. Neuendorff and MDT Ch. Hammerl-Riempp have prepared the following case study.

**Initial findings and choice of therapy**

The 76-year-old female patient has been edentulous for over 20 years and wears purely mucosa-supported complete prostheses (Figs. 1 and 2). As a consequence, the bone beds in both jaws have degenerated, resulting in pseudo-progenia with an extremely reduced volume of the alveolar ridge in the maxilla (Fig. 3). The vertical distance is enlarged due to atrophy. The mandibular prosthesis in particular revealed a more than inadequate fit so that the patient decided on an implant-supported solution following extensive therapeutic consultation. The medical history gives no contraindications for implantation. Augmentation was not to be performed, on the one hand for cost reasons, on the other because the patient only wanted to undergo a single surgical intervention. No vestibuloplasty to improve or maintain the labial soft-tissue situation is planned for the same reasons. The unfavorable relationship of the jaws is to be compensated by vestibularly oriented placement of the implants (see Fig. 7).

Also for reasons of easy handling, the prosthetic decision was taken in favor of a Locator®-retained prosthesis (LRP). Compared with fixed or other removable solutions, the prosthetic effort required is reduced considerably so that the cost element is reasonable. Furthermore, the necessary technical dental precision is easier to achieve with Locator® restorations than with bar constructions or the double crown technique. This objective can be achieved using an implant system which employs both reduced component numbers and easy work procedures. As the implantology team had no intention of sacrificing the quality of components, treatment was performed with the new transgingival iSy® Implant System by CAMLOG.

**Preparative measures and preparation of the implant bed**

The extremely atrophied bone base in the mandible (see Figs. 10 and 11) required very careful planning. This would be conducted with computer-supported systems in case of greater financial leeway. Without 3-D planning software, the necessary pre- and intra-operative information was to be obtained via laboratory techniques based on a functional and esthetic wax-up performed...
**Fig. 10:** The panoramic tomographic image shows the relationship of the drill sleeves to the anatomical structures in two dimensions.

**Fig. 11:** A crestal incision is performed on the alveolar ridge to prepare the implant beds.

**Fig. 12:** The surgical prosthetic set can be autoclaved fully loaded, is logically designed and reduced to the essentials.

Figs. 10 and 5: Together with the patient, the phonetic and esthetic aspects are modified until the patient regards the new esthetics and occlusal height as being comfortable.

**Fig. 6:** With the aid of the wax-up, a transfer template is prepared from radiopaque (teeth with roots) and transparent plastic (base).

**Fig. 7:** The projection of the tooth roots is transferred to the model. Then, the optimal prosthetic implant positions are marked.

**Fig. 8:** The sleeves for marking the implant positions are polymerized for each tooth with the aid of the root projections.

**Fig. 9:** Now, the drill template together with the wax-up of the maxilla can be tried in. Shape and alignment of the tooth roots largely correspond to those of natural teeth.

**Fig. 11** shows the intraoperative situation after exposure via crestal incision. The remaining anterior and posterior bone roughly corresponds to Cawood Class V [6], in other words, extreme atrophy of the alveolar ridge with sharp-edged crest.

The X-ray template is converted into a transfer template by ablation of the teeth in the implantation area. The surgeon determines the position and axial direction of the implants via predrilling (drill with Ø 2 mm) through the drill sleeves (Fig. 13). To facilitate subsequent placement of the iSy surgical prosthetic set includes the specific surgical instruments required for implant bed preparation. It is of simple and logical design, can be autoclaved fully loaded, and is reduced to the essentials (Fig. 12).

on the patient (Figs. 4 and 5). In the end, this served as planning and transfer template. This corresponds absolutely to routine procedures with computer-supported planning. In order to preplan the implant positions as precisely as possible, the wax-up is transferred to a radiopaque plastic. The roots are created by grinding the plastic (following the tooth axis) to the alveolar ridge (Figs. 6 to 8). The cavities between the roots and the template base are filled with transparent plastic. Finally, drill sleeves are polymerized taking the inclination of the teeth axes into account.

The X-ray template is used on the day of implantation and a panoramic radiograph performed instead of a 3D image (Figs. 9 and 10). The image gives the surgeon fairly good orientation over two levels, and shows that four implants can be inserted in positions 34, 32, 42 and 44.
the Ø 2.8 mm iSy pilot drill, the predrilled hole is expanded with the round bur (Ø 3.5 mm) (Fig. 14), whereby the sphere is sunk to the equator. Every iSy Implant Set includes a sterile single-use form drill (Fig. 15). Pilot drilling follows pre-drilling and is drilled to the desired implant length. A directional and depth indicator is placed in the drill hole to provide orientation for subsequent form drilling (Fig. 16). In this case study, the diameter of the central implants was 4.4 mm, that of the two distal implants 3.8 mm. Because of the relatively great diametrical difference between the pilot and the single-use form drill, preparation should be performed with only slight pressure, but “swiftly” and with ample cooling. To avoid compression stress to the cortical bone, a thread is cut prior to implantation in this case (Figs. 17 and 18).

**Implantation**

iSy implants are supplied pre-mounted on an “implant base” and packaged sterile. The implant base is an insertion post, which at the same time acts as base for the healing cap, the temporary restoration, and the impression cap (Fig. 19). To remove the implant, the iSy implant driver is fitted into the implant base (Fig. 20), the ensemble placed directly in the oral cavity (Fig. 21), and the implant screwed in manually as far as possible. Using the iSy Torque wrench, the implant is then driven into its final position (Fig. 22 a). The transition from the micro-rough (Promote® plus) to the machined surface (front face of the implant) should be at bone level (Fig. 22 b). The implant bases (see Fig. 19) remain in the implants until the Locator® abutments have been screwed and the insertion of the final work (see Fig. 35). Figure 23 shows all
CASE STUDY

Fig. 27: The healing caps are removed and the supplied multifunction caps placed.

Fig. 28: Initially these serve to determine the jaw relationship with axis-adequate transfer of the maxillary position.

Fig. 29: The multifunction caps are suited for both analog or digital impression-taking. In this case, conventional impression-taking with a dual-phase polyether was performed.

four inserted implants in a panoramic tomographic image. The iSy Implant System is intended for transgingival healing. For practical purposes, the healing caps are therefore included in the implant set (Fig. 24) and need not be ordered or stocked separately. The PEEK caps are inserted on the implant bases with a snap mechanism. Then the soft tissue can be sutured peri-implan- tarily and saliva-proof (Fig. 25) to ensure osseointegration and soft-tissue healing for the first 10 postoperative days. Then, the temporary prosthesis is placed “hollow” at the implant emergence sites and the entire base lined with permanent soft plastic in centric occlusion.

Impression-taking and finishing

This is reflected by good healing (Fig. 26). After removing the healing caps, the iSy multifunction caps, which are also included in the system pack, are placed (Fig. 27). First these are used to determine the jaw relationship (Fig. 28) and then for final impression-taking with polyether impression material (Fig. 29). The implant bases are unscrewed in the same session and the gingiva heights of the Locator® abutments defined according to the mucosal thickness.

Then, the implant bases are screw-retained again in the patient with healing caps until insertion of the final restoration. In the laboratory, the laboratory bases are screwed together with the lab analog and placed in the multifunction caps, the master model is fabricated and articulated (Fig. 30). Once the multifunction caps and the implant bases have been removed (Figs. 31 and 32), the preselected Locator® abutments can be screwed in (Fig. 33). The exact position of the
Fig. 30: The master model with multifunction caps placed on the implant base, …

Fig. 31: … after removal of the caps, …

Fig. 32: … after unscrewing the pre-mounted implant bases.

Fig. 33: … and after screw-retaining the Locator® abutments.

Fig. 34: The metal reinforcement cast in remanium.

Fig. 35: In order to bond the Locator® housing in the mouth, the undercuts are sealed with white Locator® block-out spacers.

Fig. 36: The recesses for the Locator® abutments are filled with self-polymerizing plastic and placed over the matrices.

Abb. 37: The wax try-in.

Fig. 38: The Locator® housings incorporated in the metal reinforcement.

Fig. 39: The mandibular prosthesis from basal with blue Locator® retention inserts for easy removal of the denture from the mouth.

Fig. 40: The screwed-in Locator® abutments on the day of inserting the restoration. The locators in regio 44, 42 are GH 4 in regio 32, 34 GH 5 …

Fig. 41: … the inserted prostheses from the front …
Locator® retention range is 1.6 mm above the gingiva. The non-precious metal framework for the prosthesis base is fabricated over the inserted Locator® housings (Fig. 34).

To obtain maximum precision and absence of tension, the Locator® housings are bonded to the framework in the mouth (Figs. 35 and 36). Then a second wax try-in is performed on the metal framework to check esthetics and function. Only after this wax try-in (Fig. 37) are the mandibular (Figs. 38 and 39) and maxillary prostheses completed. Figures 40 to 42 show the Locator® abutments and the inserted prostheses. The patient was very pleased with the esthetic and functional result (Fig. 43).

DISCUSSION

Patients at an advanced age benefit from implant-supported prosthetics in particular when they are edentulous. Chewing ability and other functional factors are improved significantly [7], and the associated self-confidence of the patients also increases their social well-being [1]. The lower follow-up costs of an implant-supported complete mandibular prosthesis put the initial additional costs into perspective when compared with purely mucosa-supported prostheses [2].

There are a number of established treatment options for implant-supported complete mandibular prostheses. If the choice is for removable solutions, then bars, double crowns or Locator® abutments are the most important connecting options [8]. As a rule, all three are successful [9, 10]. The choice depends on the jaw relationship, manual skills, as well as on the financial alternatives of the patient. In our patient case study, all factors were in favor of the relatively easy to realize Locator® System.

An Intelligent System

For economic reasons, we selected the newly available iSy® Implant System by CAMLOG for our patient. iSy stands for “intelligent system”, which highlights its most important feature: highly efficient use, due to an extremely lean system of components. This already includes a pre-mounted temporary abutment (“implant base”), which in our case was replaced with Locators for the final restoration. The healing phase is transgingival as a matter of principle, and the healing caps are included in the set. This reduces the time required for changing components and also reduces surgical effort for exposure (see also Fig. 15). In this patient case study, we did not perform vestibuloplasty, despite extreme atrophy of the bone and correspondingly reduced attached soft tissue.

The simplified surgical protocol was only possible with very careful planning, which was performed with the aid of a radiopaque transfer template and a panoramic tomographic image. Computer-supported planning in conjunction with a DVT or CT, which is used normally, was again dispensed with for reasons of cost. Depending on the initial situation and clinical experience, the treating team could also have decided otherwise.

Preparation of the implant beds is also simplified with iSy as the implant set includes a single-use form drill. The iSy surgical prosthetic set is simple, well thought-out and of logical design, can be autoclaved fully loaded and is reduced to the essentials (see also Fig. 12). Cutting of a thread is essential in dense or pronounced cortical bone as was the case for this patient.

iSy implants are fitted with a conical internal connection with a hexagon to avoid rotation. Due to the micro-rough surface (Promote® plus) reaching to the shoulder, placement at bone level is recommended. Accordingly, the prosthetic and technical handling of the system differs, especially when compared with the
Dr. Karl-Ludwig Ackermann

is a specialist in oral surgery and has been working in the field of oro-maxillo-facial implant dentistry since 1980. He is a recognized specialist for periodontology in the EDA (European Dental Association) and works in joint practice with Dr. Axel Kirsch. Dr. Ackermann is a board member of the DGI (German Society for Implant Dentistry) and the DGZMK (German Society for Dental and Oral Medicine), lecturer at the APW (Academy of Practice and Science) and the Steinbeis University Berlin (for implant prosthetics and esthetic dentistry) and visiting professor at the Nippon Dental University Niigata, Japan.

MDT Gerhard Neuendorff

is the head of the ZIF Innovationsschmiede (Dentaltechnik Dr. Kirsch GmbH) in Filderstadt. He played a key role in developing the CAMLOG® Implant System for the field of dentistry. Gerhard Neuendorff is a recognized expert in the field of pre-prosthetic planning, implant prosthetics, titanium processing, electroplating technology and full-ceramic restoration techniques.

MDT Christine Hammerl-Riempp

is employed as master dental technician at the ZIF Innovationsschmiede (Dentaltechnik Dr. Kirsch GmbH) since 2001. The focus of her work includes: 3D implant planning, implant prosthetics, CAD/CAM technology, full-ceramic restorations.

CAMLOG® Implant System and its familiar cam-groove connection. This offers major advantages in complex restorations or difficult soft-tissue conditions. The iSy implant-abutment connection with its simpler “inner workings” is sufficiently precise and good to work with in standardized prosthetic treatment concepts, such as a Locator® restorations, but also individual tooth reconstructions in conjunction with digital processes, for example, with DEDICAM, the CAD/CAM prosthetics by CAMLOG. The overall iSy concept reduces costs for the patient, a prerequisite for treating the patient in this instance. For us, this is the central aspect for the indication of the iSy Implant System.

Conclusion

This case study demonstrates how patients with poorly fitting mucosa-supported complete prostheses can be successfully and economically rehabilitated with the aid of implants. Owing to the limited budget of the patient, the selected restoration with the new iSy Implant System represented an optimal solution.

Contact information

Joint practice
Drs. Kirsch & Ackermann
Talstraße 23
D-70794 Filderstadt
Secretariat Dr. Ackermann
Tel.: +49 (0)711 7088 166
E-mail: kl.ackermann@kirschackermann.de

ZIF Innovationsschmiede
Dentaltechnik Dr. Kirsch GmbH
Talstraße 23
D-70794 Filderstadt
REFERENCES


iSy sets new standards. Radically simple, completely efficient: With only three implant diameters in three lengths, iSy covers a variety of indications and, thanks to its digital multi-channel platform, makes workflows significantly faster – before, during and after surgery. Additionally, iSy’s first-class quality and low-cost profile make your decision even easier.

www.isy-implant.com
iSy sets new standards. Radically simple, completely efficient:
With only three implant diameters in three lengths, iSy covers a variety of indications and, thanks to its digital multi-channel platform, makes workflows significantly faster − before, during and after surgery. Additionally, iSy’s first-class quality and low-cost profile make your decision even easier.

www.isy-implant.com

This is

Thinking differently.

Opening new paths.

Leading the way.

Implanting new territory.