

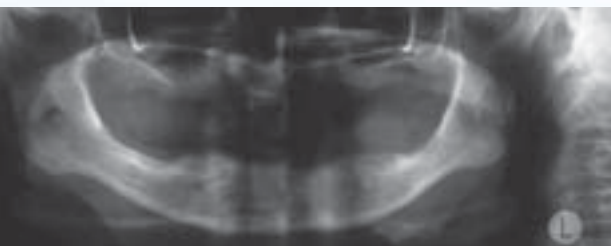


# *best age – best esthetics*

Superior restoration of the edentulous jaws  
with Frialit implants

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## **INTRODUCTION**

The effects of the continuous change of the demographic curve caused by higher life expectancy are reflected in the daily work of the dental practice. With the current life expectancy for women in Austria now at 82.97 years and for men at 77.62 years, dentists are more and more often confronted with critical and demanding patients. Many edentulous patients of advanced age are commonly most interested not only in restoration of function, phonetics and mastication, but also in natural esthetic rehabilitation.

## **CASE HISTORY**

The interaction of optimum planning, surgical implementation and prosthetic feasibility of a functioning denture will be explained using the example of a patient who was 64 years old when she started treatment. Due to a chronic generalized periodontitis all teeth in the maxilla and mandible were extracted (Fig.1). The patient then received a restoration with full dentures in the upper and lower jaw. The patient presented herself at the University Hospital for Dental, Oral and Orthodontic Medicine, Clinical Department for Dental Prosthodontics, Graz, with this restoration, which she found unsatisfactory.

The newly manufactured temporary full dentures of the maxilla and mandible were initially duplicated (clear plastic) and used as surgical guides. This defined the interforaminal position of the implants (tooth analog) in the mandible and they were also used to evaluate the prosthetic space.

## **PROCEDURE IN THE EDENTULOUS MANDIBLE**

The patient was treated in 2000 as part of a clinical trial in accordance with a protocol for immediate loading. Exclusion criteria for immediate loading were smoking and patients with bruxism.

A crestal incision was made and the mucoperiosteal flap was lifted to expose the mental foramen. Then the pilot hole was drilled with the assistance of the surgical guide. This ensures the optimum positioning and alignment of the six interforaminally placed Frialit implants in regions 44, 43, 42, 32, 33, 34 (Fig. 2). The implant diameters and lengths were identical for all implants (4.5/15 mm). The insertion torque was applied as specified by the manufacturer and the implants were placed in the bone with an insertion torque of 45 Ncm (primary stability). The patient received antibiotic and anti-inflammatory medication for eight days, with administration of the antibiotic starting one day before surgery. The patient also received precise instructions on oral hygiene at home using 0.2 percent chlorhexidine.

Implants 43 and 33 were immediately loaded with a Dolder bar (without distal extensions) (Fig. 3). The impression was taken with a customized, closed tray for transfer technique with a polyethylene material. The remaining four implants healed submerged without loading. The existing full denture was ground and only the anterior tab was polymerized.

After a healing phase of six months, a second surgical procedure was conducted to uncover the remaining four implants (Fig. 4). The average periostest value was -3.6. The following clinical

1\_ OPG – initial situation

2\_ Six interforaminally placed Frialit implants in the mandible, ....

3\_... two of which were immediately loaded with a bar

4\_ Implant uncover after six months

5\_ The definitive bar

6\_ The CT image of the situation in the maxilla shows the low bone margin

7\_ Sinus lift with bone replacement material and ...

8\_... covered by a membrane

9\_ The Frialit implants inserted in the maxilla



2\_



3\_



4\_



5\_

criteria were examined at this time: survival rate, periost values and coronal bone resorption around the loaded and unloaded implants. The average periost value for the immediately loaded implants was -2.7 and for the unloaded implants it was -5.6. The difference was statistically significant ( $p < 0.001$ ). There were also significant differences in the coronal bone resorption. The average value for the immediately loaded implants was 0.9 mm and for unloaded implants 0.33 mm. The periost values also correlate with the results (-3 to -6) for the immediately loaded implants. However, no implant loss occurred in this study.

Another impression was taken. The definitive, milled bar was manufactured (Fig. 5).

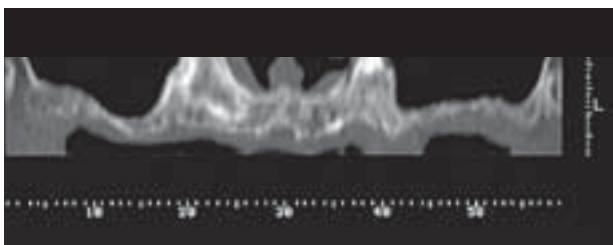
#### PROCEDURE IN THE EDENTULOUS MAXILLA

The panoramic tomographic image and the CT showed insufficient bone volume in the edentulous maxilla with a vertical bone volume of less than five millimeters. For this reason a two-stage procedure with sinus lift and then implant placement was planned (Fig. 6). The augmentation was conducted

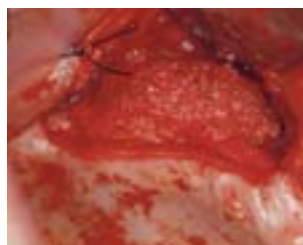
in May 2001. The surgical site was uncovered by a crestal incision (region 13 to 17 and region 23 to 27). The buccal bone window was prepared and successively extended with round drills and diamond drills. The nasal mucosa was released from the bone with appropriate sinus elevators. Bovine bone replacement material covered with a membrane was used as the grafting material (Fig. 7 and 8).

Seven months after augmentation eight Frialit implants were placed (Fig. 9). The implants were uncovered after eight months. The average periost value was -5.5. Electrobonding was used to ensure a tension-free seating of the prosthetic superstructure on the implants. As noted above, the impression was taken with Friadent transfer copings and a closed tray for the transfer technique. The Friadent EstheticBase abutments were set parallel in the laboratory. Galvanic copings were fabricated on the abutments (Fig. 10). Finally, the framework was manufactured from a CoCr alloy (Fig. 11).

The galvanic caps were glued to the framework in the mouth to prevent tension. The first step was to check the fit of the copings and framework on the master cast.



6\_



7\_



8\_



9\_

10\_ The galvanic coping on the EstheticBase abutments

11\_ The bottom of the framework fabricated from a CoCr alloy

12\_ The completed work

13\_ Follow-up image from 2004; maxilla three years and mandible four years after placement

14\_ Follow-up image from 2009; maxilla eight years and mandible nine years after placement



Then the abutments were placed on the implants and tightened with a ratchet as specified by the manufacturer. Now the fit in the mouth could be checked. The denture was glued in place in the mouth with AGC Cem. A centric record was taken in the same session. The maxillary bridge and a denture wax model were prepared in the laboratory. Particular attention was paid to mesial and distal openings of the implants to make hygiene easier for the patient.

Before completion the wax try-in was test-fitted in the patient. The bite, the anterior tooth length and inclination and a phonetic test were conducted in the same session. When both patient and physician were satisfied with the result, the work could be completed. The occlusal adjustment was completed in the mouth (Fig. 12).

#### CHECK-UP – RECALL

Annual appointments for check-ups were made for the patient at the University Hospital for Dental, Oral and Orthodontic Medicine, Clinical Department for Dental Prosthetics. The following items were checked at the appointments: implant loss, hygiene (plaque index, bleeding on removal of the secondary construction), periostest values (PTV) and coronal bone resorption (CBR) up to a maximum observation period of eight years (Fig. 13 and 14).

The average value of all measured PTVs in June 2009 was -5.3 in the mandible and -1.8 in the maxilla. A PTV of -6 and -5 was measured for the immediately loaded implants in region 43 and 33. The average CBR in the mandible was 0.92 mm and

1.2 mm for the two immediately loaded implants (Fig. 15). An average CBR of 0.62 mm was measured in the maxilla (Fig. 16). There was no implant loss. Mucositis could not be diagnosed.

#### DISCUSSION

Precise planning before starting the treatment using articulated study models and accurate extraoral and intraoral diagnosis ensure predictable implant-prosthetic results.

The success rates of immediately loaded implants in the edentulous mandible over the last three decades were between 93 and 100 percent. These results support the case for abandoning the standard Brånemark protocol and implementing immediate loading for selected patients.

However, immediate loading is only recommended in the presence of sufficient primary stability ( $> 32$  Ncm).

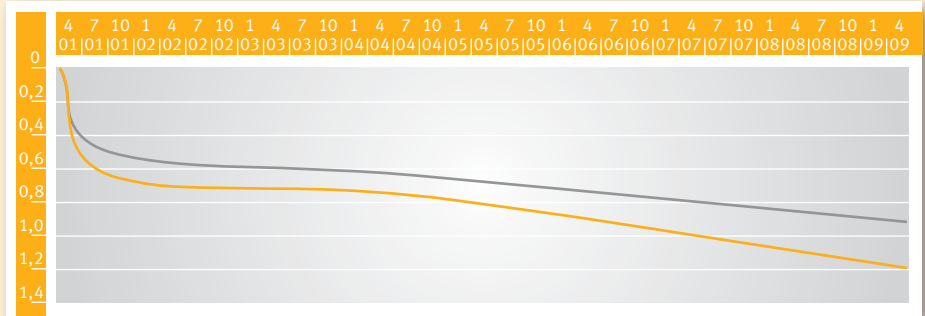
In the edentulous maxilla the anatomical conditions (pressure in the maxillary sinus) and the bone are limiting factors. There are still no randomized controlled studies for immediate loading with sinus augmentations. For this reason we do not offer this procedure in our department.

Six to eight implants are recommended for the edentulous maxilla. This ensures continuing use of the prosthetic superstructure even if an implant is lost. However, the abutments should be distributed over the entire alveolar ridge and the implants should be at least 10 mm long and with a diameter greater than 3.8 mm. Tooth-by-tooth implant placement is not necessary. Long cantilevers should also be avoided. Otherwise a reduced dentition (with three premolars) should be selected.

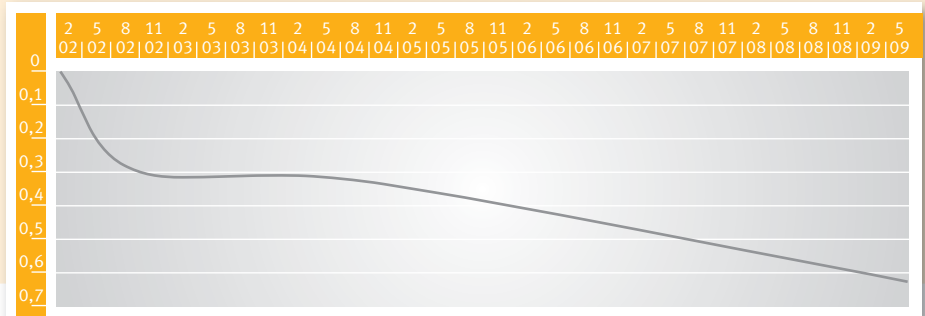
Conventional loading

Immediate loading

15\_CBR in mandible  
2001-2009



16\_CBR in maxilla  
2001-2009



**CONCLUSION**

The implant-prosthetic restoration described is one therapy option. It meets not only the functional requirements of this patient but also her esthetic expectations in her “best” years.

**In conclusion, the chronological sequence of the various stages of the treatments are presented:**

**Initial examination**

- General medical history (exclusion of risk factors)
- Clinical diagnostic results
- X-ray images (OPG)
- Photo of status quo
- Manufacture of study models for analysis in the articulator
- Anatomical transfer arch
- CT referral
- Preparation of a temporary treatment plan

**Second session**

- Discussion of a definitive treatment plan based on articulated models and the CTs
- Preoperative consultation

**Protocol**

- Mandible: six interforaminal Frialit implants (two of which were immediately loaded by Dolder bar). Definitive restoration of implants with a milled bar after six-month healing phase.
- Maxilla: a two-stage procedure was planned because of the insufficient bone volume. After nine months eight Frialit implants were placed followed by a prosthetic restoration with a plastic-veneered bridge (electrobonding technique).

Literature available on request from the authors

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