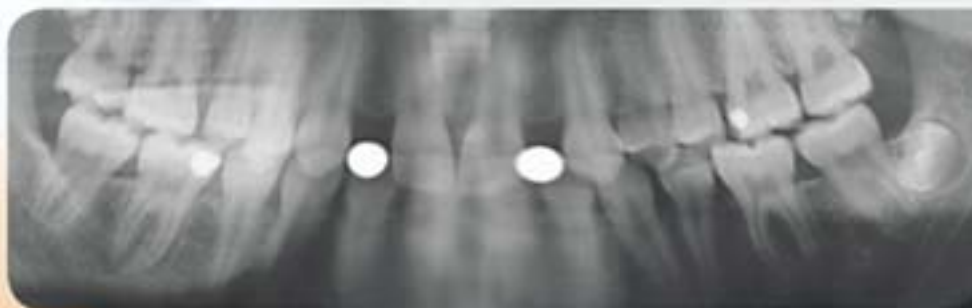




# *long-term success in the esthetic zone*

Replacing narrow teeth with Xive 3.0

| Stefan Günther | Thomas Olivier



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## **INTRODUCTION**

In the esthetic zone, not only functionality but, above all, esthetics are key to success. Both, the correct three-dimensional positioning of an implant and enough bone and soft tissue are the basis for good and stable long-term results. Especially the distance of an implant to adjacent teeth, the axial inclination, the oro-vestibular and vertical position of the implant shoulder have to be chosen accurately. When replacing individual teeth, in particular upper second incisors, the implant diameter determines the distances to adjacent teeth. The Xive 3.0 is also ideal for replacing teeth which are naturally small, as is, for example, frequently the case in Asian people. Crowding or too little bone makes an implant placement either more difficult or impossible. Implants reduced as to diameter are an important part of an implant system in such cases. Here, a case is used to identify the options and limits of an implant placement with Xive 3.0, with congenitally absent upper lateral incisors.

## **THE INITIAL SITUATION**

At the end of 2001, a female patient (aged 16) presented after concluding her orthodontic treatment. The initial situation was extremely difficult (Fig. 1) as the width of each of the gaps was only 5.8 to 6.0 millimeters. There was also convergence of the adjacent roots. At the narrowest point the mesiodistal distance was only ca. 3 millimeters (Fig. 2). Otherwise sufficient bone and soft tissue were available. At the time, implant placement was not possible due to the patient's age and due to these initial findings. The pre-existing implant diameters would not permit an implant placement while adhering to the known parameters. 2 millimeters, but at least 1.5 millimeters, are considered to be the ideal distance between implant shoulder and the adjacent tooth. Therefore, only a maximum implant diameter of ca. 2.9 to 3.0 millimeters could be permitted for this patient. The ideal distance between the implant and adjacent tooth assures maintenance of the approximal crestal bone shoulders and the papillae. In our opinion, an

esthetically demanding restoration can only be afforded by a two-part system with ceramic abutments. The distance between the roots was a big problem because the root surfaces could be touched by an implant placement and cause corresponding complications. After being advised on treatment options, the patient opted for no further orthodontic correction or bridge restoration. As the launch of Xive 3.0 was foreseeable, the patient aged now nearly 18 decided to wait. In March 2003 the Xive 3.0 implant came on the market and the preparations for implant placement could begin. First, the teeth were set up ideally on the model, and then the x-ray and drill guides were manufactured. After producing a radiographic measurement with guide and measuring balls (Fig. 1) and subsequent bone height measurement, the surgery was able to begin in June 2003.

#### THE INSERTION

A marginal incision direction without relief was chosen. If a relief should be necessary, it has to be positioned distally in the area of the canines in order to move any potentially occurring scars to a non visible area. After exposing the surgical site by a periosteal flap, an initial hole (diameter

2 mm) was drilled using a drill guide. Dental x-rays were subsequently made with the Xive Select try-in implant to check the direction and position (Fig. 2). An up to 13 millimeters in length and 3 millimeters diameter ablative preparation of the implant site then followed. The approximal crestal distance to the adjacent teeth was 1.4 to 1.5 millimeters in each case. The vestibular implant shoulder was behind the connecting line between the vestibular necks of the adjacent teeth. The implant axis ran through the intended incisor line and the shoulder was at crestal bone level – 2.5 millimeters below the cemento-enamel junction of the adjacent teeth. Hence all the required parameters for the three-dimensional axial alignment of the implant could be met. The Xive 3.0 implants were then mechanically inserted at a torque of 40 and 45 Ncm each (Fig. 3). A positional index impression was made for manufacturing the temporary dentures before the wound was closed. The dental technician manufactured an ideal crown during the healing phase to contour the soft tissue. At four months, the implants were uncovered with a crestal, slightly palatally located incision and displacement technique to preserve soft tissue. A mucosa flap was prepared towards the vestibular region. The bone was to remain covered by the periosteum in



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- 1\_ Preoperative x-ray with measuring balls
- 2\_ Check on axial alignment and spacing with the Xive Select try-in implant
- 3\_ Postoperative radiographic check
- 4\_ The temporary denture is fabricated on an EstheticBase abutment.
- 5\_ Individual button sutures secure the approximately adapted mucosa flaps.
- 6\_ The situation after six months
- 7, 8, 9\_ Condition after six years with temporary crown

order to prevent absorptive processes from denuding the periosteum. Today, we would recommend a minimally invasive displacement after a stab incision.

Straight EstheticBase abutments ground from vestibular were used as a mesostructure (Fig. 4). After checking the form and the position of the approximal contact points, the plastic crowns were inserted with temporary cement. The flap displaced to vestibular was adapted approximately with individual button sutures (Fig. 5). The approximal contacts of the temporary dentures must be situated at a maximum of 4 to 5 millimeters from the crestal approximal bone in order to allow papillae to develop in the gaps. The soft tissue was already perfectly shaped after four months (Fig. 6). The temporary plastic denture offers the benefit that it can still be modified subject to the healing process. Nowadays, contrary to the former procedure, we prefer screw-retained temporary dentures to rule out the danger of a peri-implant infection from cement residue.

### THE DEFINITIVE RESTORATION

Due to subjective satisfaction the patient did not wish any definitive restoration for a long period. Owing to the condition of the plastic temporary teeth the patient did not opt for a definitive restoration until six years had passed (September 2009). It was important to safeguard the state that had been reached (Figs. 7 to 9). For this reason, it was necessary to prepare individual transfer abutments. First, the emergence profile of the temporary crowns was transferred into a silicon matrix (Figs. 10 and 11). After exchanging the crown for a transfer abutment (Figs. 12 and 13), free-flowing, light-curing composite is poured into the cavity (Figs. 14 and 15). The individual transfer abutments (Fig. 16) were checked clinically and radiologically prior to impression for gapless and correct positioning. With closed impression (repositioning technique) low viscosity material is extruded around the Transfer-Caps (Fig. 17) and then the individual tray is integrated. The ceramic crowns (Fig. 18) were prepared on the master cast with removable hard gingival mask. The core of the crowns was made of pressed ceramic material in order to prevent the angled EstheticBase abutments from showing through. The



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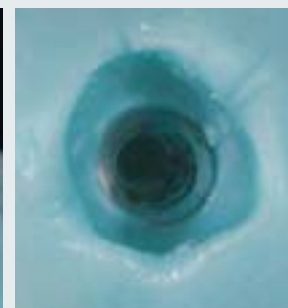
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10, 11 Transfer of the emergence profile

12, 13, 14, 15, 16 Fabrication of an individual transfer abutment

17 The individual transfer abutment is coated before the tray is inserted.

18 The finished fully ceramic crown insertion of the definitive restoration

optical and dynamic features of natural teeth were imitated with the subsequent veneering (Fig. 18). Due to the temporary restoration, it was possible to realize ceramic implant-supported crowns with optimum esthetics and functionality after wax-up and optimization (Figs. 19 to 21). The result was outstanding, which meant that after checking the accuracy of the fit, occlusion and contact points, the crowns were definitively attached.

**CONCLUSION**

The perfect esthetic and functional result of this implant-supported dental restoration over a 7-year period shows that diameter-reduced implants effectively broaden the indication spectrum and allow secure usage with stable results. Key to success, especially in the esthetic zone, is a clear concept and the selection of top-quality materials. The Xive 3.0 can support surgeons, prosthodontists and dental technicians enormously in difficult anatomical conditions. ■

Literature on request from the authors



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