successful esthetics ...

... in Cleft Lip, Jaw and Palate through Implantation with Xive 3.0

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INTRODUCTION

The treatment of gaps in the anterior sector presents the challenge of achieving attractive cosmetic results as well as adequate functionality. For patients with cleft lip, jaw and palate (LJP) there are further special considerations for implantation arising from the resulting anatomical changes. The frequency of occurrence of cleft LJP in Central Europe is estimated to be around one in 500 births.

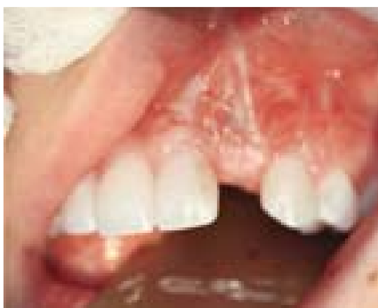
Anatomical conditions

For patients with cleft LJP, the implants are not only the holder for the dental prosthesis but they also have another important function. The implant loads the bony augmentation material in the area of the cleft jaw and so prevents pronounced bone atrophy. The soft tissue at the implant site represents another special aspect. A large amount of scar tissue is present as a result of the preceding multiple cleft operations. This causes extremely difficult soft tissue conditions that significantly hamper cosmetically acceptable perio-implant soft tissue reconstruction. In addition, the edentulous spaces can be very small on conclusion of pre-treatment (cleft surgical interventions, orthodontic treatment). The low gap width is often accompanied by reduced vertical and sagittal bone availability. Despite the pre-treatment, dysgnathic relationships often remain between the jaws.
Successful treatment with implants is also possible for patients with cleft LJP. The results can be functionally and cosmetically comparable with conventional treatment with implants. The complex treatment procedure requires very close cooperation between the cleft surgeon and the implantologist. The approach is presented with a case study.

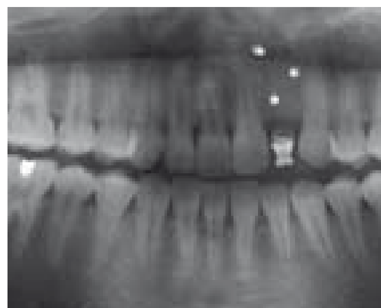
THE TREATMENT

Medical history and findings

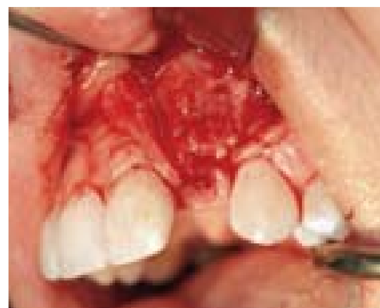
The female patient had a complex, broad, left-sided cleft lip, jaw and palate that had been closed. Osteoplastic cleft surgery was performed at the age of 10. On completion of the cleft surgery itself and orthodontic treatment, the young women, now 17, had an edentulous space in region 22 and severely scarred tissue in the vestibulum (Fig. 1). The width of the edentulous space was 5.5 mm. There was also significant bone atrophy. Furthermore, pronounced scarring of the vestibular soft tissue with intermaxillary dysgnathic anomaly was presented.



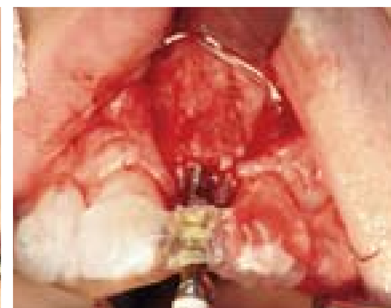
1_Situation after re-augmentation and prior to implantation in a 17-year-old female patient



2_Orthopantomogram for measurement with superimposed drilling template. The iliac crest graft region 22 is fixed with three osteosynthesis screws



3_Region 22 was opened three months after osteoplasty. It was presented as a non-infected, healed in, non-atrophic bone graft



4_Pre-drilling of the implant cavity using a drilling template

Implant placement

Realignment osteotomy was firstly performed in the maxilla to improve the intermaxillary relationship. Four months later, re-augmentation of the cleft jaw was undertaken with an autogenous iliac crest graft. Fixation was performed with osteosynthesis screws (Fig. 2). To facilitate good bone healing, but to avoid the risk of atrophy, these screws were removed 3 months later (Fig. 3).

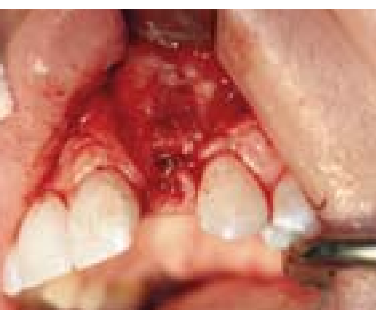
A DVT and a drilling template were produced in preparation for the implant. A non-infected, healed bone graft was presented interoperatively (Fig. 4). For this reason, a Xive implant of 3.0 mm diameter and 15 mm length was inserted as part of this intervention. The implant showed primary stability and was completely surrounded by bone (Fig. 5). The insertion requirements in accordance with the Buser protocol were observed on account of the quantitatively good bone conditions.

An excessively thin approximal bone layer (‹ 1.5 mm) between implant and tooth root can cause problems with osseointegration of the implant and pronounced bone resorption. An adequate bony foundation is required for development of the papilla in order that there is no subsequent cosmetic impairment. To avoid complications due to the low gap width and the constricted space conditions, the choice was made for a reduced implant diameter of 3.0 mm.

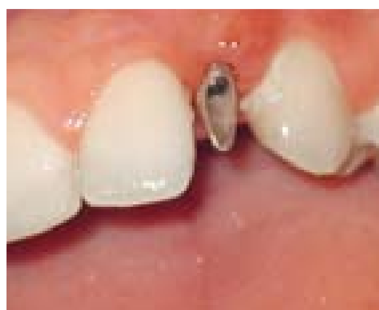
The second reason for the choice of implant arose from the bone quality. Soft bone (D III) is often encountered three months after osteoplasty. Xive's thread design allows a good condensation effect and therefore high primary stability.

The implant was exposed after four months with a semilunar incision and vestibular displacement of the palatal tissue. A gingiva former of 3 mm height was then adapted. The prosthetic measures followed. The EstheticBase (Fig. 6 and 7) served as the holder for the cemented Cercon crown (Fig. 8).

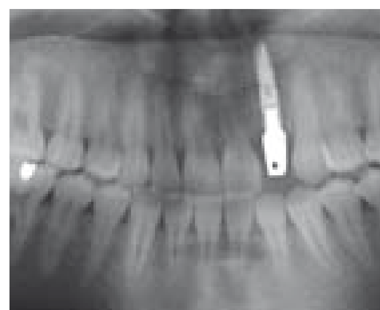
The implant has been in a good functional state since 2006. It was also possible to achieve very attractive cosmetic results as a result of the stable peri-implant hard and soft tissue conditions.



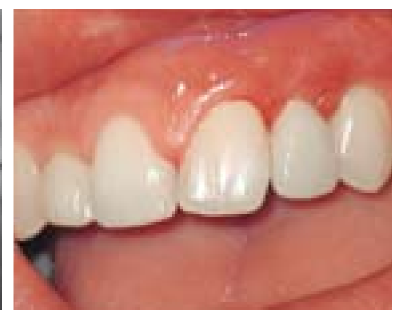
5_Primary stable inserted Xive implant (3.0 / 15). The implant is completely surrounded by bone and is inserted according to the Buser protocol



6_The Xive implant with EstheticBase abutment



7_Situation after insertion of the EstheticBase abutment. Primary stable bony enclosure of the implant. Flush implant – spacer sleeve transition



8_Situation after cementing the individual crown in region 22. A cosmetically inconspicuous treatment despite extremely difficult initial conditions

THE SUCCESS

Very few reports of implantological treatment of the cleft jaw exist in the literature. The essential insight is that implants are of major benefit for LJP patients despite the complex primary implantological conditions and specific risks. Landes demonstrates in a study that the probability of success of implants in the cleft jaw is comparable with the prognosis of success of implants inserted following traumatic tooth loss. Matsui et al. emphasize however that sufficient bone availability is a crucial prerequisite for successful implant treatment in this group of patients. Owing to the difficult initial anatomical conditions, the iliac crest graft, as conducted at the University Hospital Essen, is favored in the literature.

In order to obtain the desired functional and cosmetic outcome of treatment, various aspects have to be considered or are important with LJP patients. These are: interdisciplinary cooperation, favorable dental situations and intermaxillary relationships, as well as the appropriate peri-implant soft tissue management. Nevertheless, despite extensive pre-implantological pretreatment, difficult conditions often remain, e.g. constricted edentulous spaces. This calls for a surgically and prosthetically flexible implant system. According to the experience of the University Hospital Essen, Xive with a 3.0 mm diameter is especially indicated. This reduced diameter is often applied in such complex cases. Thanks to its deep inner connection and stable geometry, the implant still offers reliable mechanical stability. The full surgical and prosthetic flexibility is provided by the two-part abutment. ■

Literature available on request from the authors

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