

The Functional Reconstruction of Unilateral Free End Gaps after Giving Due Consideration to Posterior Maxilla and Antrum Reconstruction

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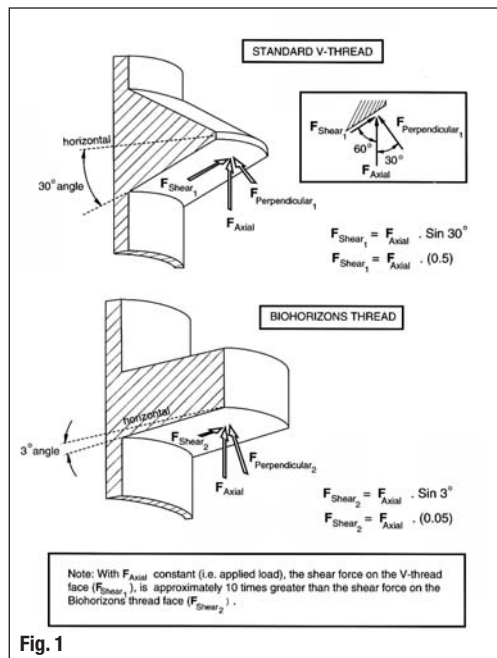


Fig. 1

Fig. 1_ Comparison of the original thread design and the Maestro system. Photographs courtesy of Bio Horizons Company.

“The implant-based or implant tooth-supported rehabilitation of a shortened tooth row is definitely the best provision variant both functionally as well as aesthetically.” (Quotation from: The prosthetic provision of gap bite—information from www.dgzmk.de.)

The restoration of the free end gap is becoming more and more important with time. Scientifically established augmentation processes that are used routinely allow the insertion of implants and the permanently fitting rehabilitation of chewing units. The incorporation of neighboring anatomical circumstances is dropped, the loading of existing teeth for anchoring prosthetic structures is

dropped, and the filling of the mouth cavity with additional supporting structures is also dropped. Thus, implant based rehabilitation of the shortened tooth row actually represents a particularly prophylactic-oriented treatment measure in the long term, and is also the functionally and aesthetically best provision

variant, as characterized by DGZMK (Deutsche Gesellschaft für Zahn-, Mund- und Kieferheilkunde, German Society for Teeth, Mouth and Jaw Medicine).

Case description

A 33-year-old male patient introduces himself with a free end gap in the right upper jaw from tooth 13 and he wants to have a permanently fitting restoration. The OPG shows a strong pneumatized jaw cavity with a remaining bone height of less than 5 mm (Figure 2). As the bone height above the jaw cavity is less than 5 mm, a two-sided process is the means of the selection (SA4). In connection with an augmentation, the existing bone quality cannot be improved through D3. The Maestro system (of Bio Horizons) offers the special D4 Implant for this situation in 9, 12, 15 mm lengths, and 4 mm as well as 5 mm diameters.

Main properties of the implant used

– The thread design is rectangular in shape. The mechanic defines the rectangular thread as “power thread,” which has its special indication during power transmission. This thread exercises 10x more compression power on the bone as compared to a comparable “V” thread design. It was developed for connection or “fixation” of two surfaces of different objects (Figure 1).

Fig. 2_ OPG of the presented case at the start of the treatment.

Fig. 3_ OPG of the presented case after the sinus elevation.



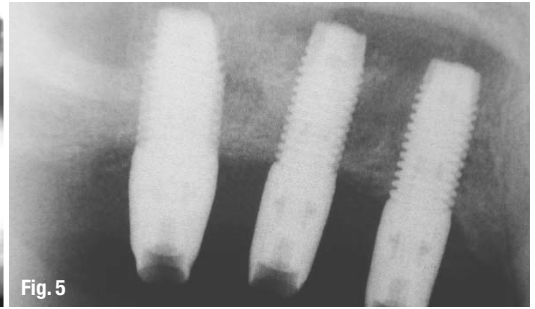
Fig. 2



Fig. 3

Fig. 4_ OPG of the presented case before reentry.

Fig. 5_ X-ray control of the build up adjustment.



D4 implants have the following specialties

- The number of threads per length unit is increased and thus adjusted to the sunk bone quality.
- The HA coating of the implant surface in case of bad bone quality was confirmed in many studies to date.

The D4 implant in a length of 9 mm and a diameter of 5 mm has an enlarged root surface (468 mm²) due to the above-mentioned properties. Similar products have a maximum surface of 200 mm².

The treatment was carried out according to the common protocols

1. Sinus elevation using PRP and Tricalcium-phosphate. The healing time was 6 months.
2. After successful healing, insertion of three "root form" implants was undertaken.
3. Second stage starts after five months.
4. Prosthetic rehabilitation.

Protocol of sinus augmentation (based on Tatum)

The Tatum protocol for the release of the lateral sinus wall was followed. An expanded, angled incision on the palatal part of the toothless alveolar ridge was carried out up to the region of the corner tooth. The cretinized gingiva was given special attention, which existed here to a very small extent. A releasing vestibular incision in the retro maxillary region improved access and vision. A full thickness flap was lowered and the most important anatomical limitations were displayed. The length of the flap could be increased with the help of a periost slitting.

Under conditions of constant cooling, the scope of the lateral access window was primarily centered and secondarily removed with a rose borer for better

viewing of the membrane. The window was closed carefully by applying pressure from the caudal to the cranial. The cutting membrane could be mobilized without any injury and moved to a new cranial position. The filling of the created cavity was done with the initially created bone replacement mixture in accordance with the customary method. The augmented unit was protected by a bio-absorbing membrane (Osseo Quest from Gore Company). The wound was closed with ePTF sewing material (Gore-Tex from Gore Company). The healing took place without any complications (Figure 3).

The implantation was conducted after six months. The quality of the newly gained bone was graded as D3 (Starter from Bio Horizons company) in the framework of the explorative boring. The pilot bores were placed in the future insertion positions with the boring stencil. The implant alveola was enhanced with the help of osteotomes. This way the bone density around the implant could be increased through compression.

Implant selection (Maestro, Bio Horizons Company):

- Tooth 14 = D4, length 10 mm, diameter 4 mm
- Tooth 15 = D4, length 10 mm, diameter 4 mm
- Tooth 16 = D4, length 9 mm, diameter 5 mm

The implants were inserted mechanically with the following torque values:

- 14 = 45 N/cm²
- 15 = 20 N/cm²
- 16 = 20 N/cm²

Fig. 6_Build up of the master model.

Fig. 7_: The identity key.

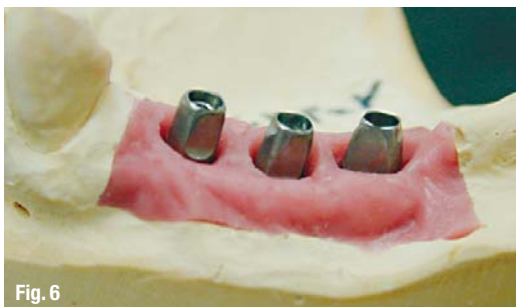




Fig. 8 Coronal view of the prosthetic restoration.

Fig. 9 The finished job on the Maestro model.

The wound was sealed tightly with ePTF sewing material (Gore-Tex from Gore Company). The wound healing process did not have any complications (Figure 4). The implants were released after exactly five months and they were provided with healing caps. The gingival healing progressed according to expectations and lasted 14 days. There was a deformation with open tray. The seat of the impression post (= introduced post) was checked through radiography. The articulation took place in a medium value articulator. The usual bite registration process allowed the articulation of the counter jaw.

A prosthetic implant distinguishes itself through optimal topographical placement in a specially created bone bed. A specialty of this system is that definitive construction can be used as temporary construction, impression post and as definitive construction. This means cost savings for the patient. The titanium abutments were prepared in the laboratory (Figure 6). An identification key (Figure 7) made of Resin Pattern (GC company) was created in the laboratory so that the construction could be integrated easily and with precision.

The created prosthetic restoration (Figures 8, 9) can be described as follows:

- blocked single crowns, shaped especially for effective hygiene,
- blended with ceramics,
- surface shaped proximal ratios (optimized for oral hygiene measures),
- meagre palato-vestibular platform,
- inter-occlusal encryption with the help of "B" and "C" contacts.

The constructions were placed in situ with the help of the identity key (Figure 10). The radiography test confirmed the exact fit (Figure 5). The titanium

screws of the construction were drawn with 25 N/mm². The prosthetic restoration was cemented with IM (Nobel Biocare Company). The occlusal contact ratios (Figure 11) and the cleaning capability were checked. The patient was released after a control period in a routine recall.

Summary

The reconstruction of maxillary free end gaps represents a special challenge to diagnostics, therapy and material selection as well as to patient and dentist. The precise indication enables the determination of treatment protocols, the strict observation of the existing protocol, the selection of suitable instruments, augmentation material and technology. The targeted selection of the implant, paying special consideration to the architecture, guarantees optimum results.

(A complete list of references is available from the publisher.)

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Fig. 10 The set-ups in situ.

Fig. 11 Control of the occlusal contact ratios.