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Immediate Loading of Implants in the Partially Edentulous Maxilla: A Case Report of a Novel Technique with Strategic Implants

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Abstract: *Recently the technology of theStrategic Implant® [1]has gained popularity worldwide, owing to its unique horizontal retention design that functions by getting engaged into the basal (2nd or 3rd) cortical bone, thus allowing it to be placed even in those cases, where the vertical bone supply is reduced such as moderate to severe or even ultimately resorbed ridges. The aim of this paper is to present the clinical application of a new, smooth surfaced single-piece bi-cortical screw implants(with multiunit abutment) with immediate loading protocol to restore partially edentulous distal maxilla without sinus lift procedure. Here, we report the case of a 50-year-old, healthy female patient with a history of bilaterally missing maxillary posterior teeth. We restored thepremolars and molars with fixed screw retained prosthesis within 72 hours offlaplesscortical screw implants placement (comprising multi-unit abutment heads).*

Key-words: *Strategic Implant®, immediate functional loading, single-piece dental implants, cortical implantology,*

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I. Introduction

Crestal implants (i.e. implants inserted from the top of the alveolar crest into the bone such

as cylinders, screws and other types which are inserted into the jaw bones to stay in a defined relationship with the crestal, "1st" cortical) are indicated in situations where an adequate vertical bonesupply is present. Although suchcrestal implants are dominating the implant market their success unfortunately depends on the stability of the 1st cortical, and they demand large amount of vertical bone. If such bone is missing various bone augmentation procedures become part of a treatment with crestal implant types[1]. The principal problems of all these crestal implant systems are identical, although manufacturers of such implants frequently claim that "their" implant is superior to all others. Typically implantologists world-wide tend to change their "preferred implant system" as a result of those advertised claims, however after maximum a few years they change the system again, because theyhave seen that their hopes and the claims were not realized. Augmentations increase the overall costs of dental implant treatment aswell as the number of necessary operations and thereby the risks. The primary treatment modality for the distal upper jaw is a sinus lift procedure with bone augmentation inside the maxillary sinus, done in order to increase bone height there. Typical complications are excessive bleeding,Schneiderian membrane perforation, post-operative infection on the oral side, (recurrent) sinusitis, loss of callus and augmentation, as well as donor site morbidity in case of autogenous grafting. All these complications as well as the additional costs lead to a situation where patients tend to avoid augmentations, there arises a need to seek alternative treatment modalities in order to overcome these limitations[1].

One of the greatest challenges of restoring missing teeth in the posterior maxilla results from the fact that both from the sinus-side and from the oral cavity jaw bone tends to resorb and it also tends to deteriorate in quality after tooth extraction. This thereby gives rise to unfavorable conditions that may impede the placement of implants in that region[2-4].The technology of the Strategic Implant® overcomes this problem in a different manner compared to both conventional implant systems and conventional technology. Their load transmitting

[1]Manufacturer: Simpladent GmbH, Dorfplatz 11, CH-8737 Gommiswald, Switzerland

threads are anchored in native, residual, cortical bone areas often far from the actual clinical tooth, i.e. distant in a vertical and/or sagittal and/or horizontal direction[5]. The Strategic implant® not only avoids any additional surgical procedures but also provide reliable anchor in cortical bone even in severely reduced vertical bone heights, and it can (actually must) be loaded immediately without any waiting period. The technology of the Strategic Implant ® is a modern implantologyprocedure which utilizes stable cortical portions of the jaw bones for retention of the dental implants. Cortical bone provides excellent quality for retention of these unique and highly advanced implants. Dental implantology with the Strategic Implant® follows the application of the rules of orthopedic surgery& traumatology[6].Basal bone is defined as the resorption-stable part of the osseous tissues of the mandible and maxilla which are underlying the alveolar processes.[7]It is a stable and almost unchangeable formation of trajectorial bone in the mandible and maxilla.[8] The basal bone is present throughout life; it is very strong and forms the stress bearing part of our skeleton. If dental implants are anchored in this bone they can be loaded (actually splinted) with fixed tooth restorationsimmediately. In the technology of the Strategic Implant® the rules of traumatology and orthopedic surgery apply more than anything else, although the actual work is done by dentists and in the oral field. Many of the rules had to be transferred actively by the founders of the technology and they are described today in a number of essential textbooks which have been published in all major languages of the world.

The aim of this paperwas to present the clinical application of a new, smooth surface, one-piece(with multiunit abutment) cortically anchored screw implantwith immediate loadingprotocol. The implant neckis bendable, which allows to achieve parallelism easily and without extra parts and costs. This article reports the successfulclinical case of immediate functional loading of such implants in the lateral edentulous maxilla with screw retained prosthesis, without any sinus lifts norbone augmentations and with no risk of peri-implantitis.

II. Case Report

A 50-year-old, healthy female patient with bilaterally missing upper posterior teeth presentedto the clinic with a chief complaint of difficulty in chewing and a desire to have fixed restored teeth for the same. Clinical examination [Figure 1& 2] revealed bilaterally missing premolars and molars in the maxillary arch. Radiographic examination [Figure 3] revealed severely atrophic posterior maxillae and increased pneumatization of themaxillary sinus The decision was made to use asingle-piece immediate loading smooth surface bicortical screw implants with multiunit abutmentwith screw retained prosthesis(Figure 4).Local anesthesia was achieved with lidocaine 2% with adrenaline 1:100000. Infiltrationwas made in the greater palatine area of the soft palate and lateral buccal vestibule and posterolateral part of palate. Following soft tissue cleaning with antiseptic 5% Betadinesolution (water based), flapless surgery preparation of osteotomy sites was carried out using the sequential order of calibrated drills recommended by the manufacturer, cooled with saline solution in external mode at a speed of 27000 rpm, implant beds were prepared with the use of a 2.0 mm drill (30 mm long) . For the distal maxilla we used the straight handpiece, for the anterior implants angled handpieces 1:1 were used. Two long one-piece implants with a diameter of 3.6mmand a length of 23mm and 29 mm were placed and anchored in the cortical inpterygoidplate of the sphenoid bone on the right side, where superior primary stabilityis achievable. Implants with the length of 26mm and 23mm were placed and anchored in the distal maxilla in the left side of the patient, with one implant being anchored in the pterygoid process of the sphenoid bone. The more anterior distal implant reached through the palatal side of the alveolar bone of the maxilla up to the cortical of the nose. Anteriorly, in the premolar area,two long single-piece implants with a diameter of 3.6mm and a length of 17mm and 14mm were placed and anchored in anterior wall of sinus and canine buttress area on both sides. The implants were bent to a favorable position of the internal thread so that screw access holes comeocclusally(figure 5 and 6).Immediately after surgery final impression was taken for final prosthesis.Open tray impression posts were fitted on to BECES® MU implants and both side all four impression post were splinted with pattern resin for accurate impression(figure 7) and open tray impression was taken with putty and light body of polyvinyl siloxane material.Within 72 hours final metal fused to ceramic prosthesis screwed in onto the implants and final tightening of screw done at 35N torque(Figure 10 and 11). Access holes were blocked with Teflon and covered with composite material(Figure 13). Very good result of this treatment was achieved with high patient satisfaction (Figure 14).

Figure 1 and 2: Clinical intra-oral examination. The lower jaw shows periodontal involvement but does not need immediate treatment or extraction. After this implant treatment the lower premolars and molars will be under regular functional load, which will increase chances for higher mineralization and prolong tooth survival.

Figure 3: Radiographic pre-operative view.

Figure 4: BECES® MU (single piece multi-unit) implant on the delivery holder

Figure 5: Implant placement

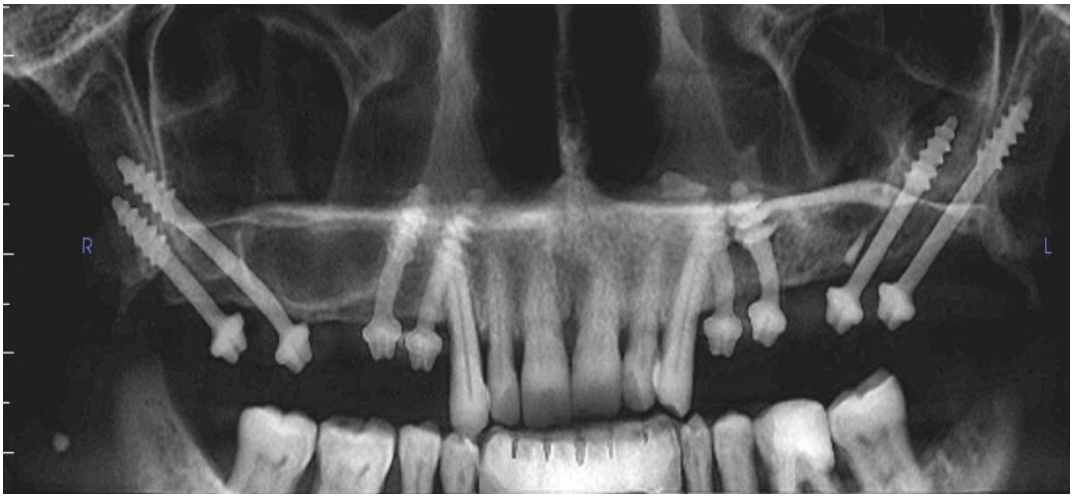

Figure 6: Radiographic view post implant placement.

Figure 7: Impression post splinted with pattern resin and before pick-up impression

Figure 8 and 9: Screwable porcelain-fused-to-metal restoration (outer and inner view)

Figure 10: Final torque given at 35N

Figure 11: Final Prosthesis

Figure 12: After sealing the holes in the prosthesis with Teflon and covering with composite material

Figure 13: Post-operative view

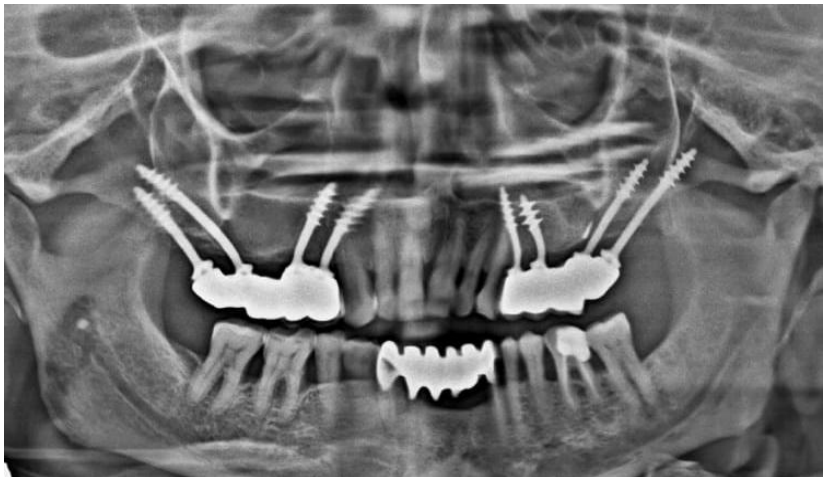

Figure 14: Post-operative radiographic view

III. Discussion

The expanded sinus cavity and shrinking posterior maxillary alveolar bone both make it difficult to place conventional dental implants posterior to the first premolar without sinus augmentation. Placement of an implant into the pterygoid plate area has been used to overcome these anatomic obstacles, allowing successful restoration of the area[9]. Balshi et al [10], Pi [11] Fernandez and Fernandez [12], Balashi and Wolfinger[13] reported results of pterygomaxillaryimplants with a high success rate.

Vila-Bioscaet al.[14] compared pterygoid implants with thesinus lift technique. The authors explained the main indications,advantages and inconveniences of both procedures. Theyconsidered the pterygoid implant technique to be less invasive,with a usually shorter intervention time and interval to patientrehabilitation.

There is a general tendency to reduce treatment times and to simplify treatment procedures in order to increase patient acceptance and to reduce the risk of complications. In implant dentistry, treatment time can be shortened through early or immediate loading. It is widely accepted that immediate loading is desirable if the outcome in terms of implant survival and treatment success is comparable with that of conventional loading.

The Strategic Implant® totally changed the possibilities of dental implantology world-wide. Sinus lift procedures have become avoidable today because all patients have sufficient native bone for anchoring these implants, even if the formerly necessary "vertical bone" is missing. BECES MU implants are placed flapless, i.e. they require only a minimally invasive procedure through gum[15]. Masticatory load transmission[7]is confined to the horizontal implantsegments andessentially to the cortical bone structures. This virtually eliminates the need for vertical bone augmentation procedures.

Advantages of the technology of the Strategic Implant®:

1. No bone graft is necessary
2. The anterior-posterior spread is maximized; there is no need for cantilevering.
3. Treatment time is shorter than with sinus grafting, no healing time.
4. Safe load transmission into basal and cortical bone
5. No peri-implantitis[16]
6. Immediate functional loading
7. Minimally invasive, minimal surgical complications, simple prosthetic treatment.

IV. Conclusion

There are today advanced options for immediate implant placement and immediate functional loading of implants in distal maxilla available. The technology of the Strategic Implant® avoids nowadays bone grafting. One such case is shown here as an example. The Strategic Implant® allows treatments in a much shorter chair time and with less and cheaper parts compared to traditional Multi-Unit Implant systems. This helps us to treat many more patients than earlier, in fact we hope to provide fixed teeth to everyone as soon as the technology will spread further and enough dentist technicians (or computerized equipment for individual but automatized prosthesis production) are available.

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