Two stage surgery in IV class of Misch with SIS device: a case report

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Introduction

In upper-lateral areas rehabilitations an osseous ridge insufficient for inserting dental implants can be often found out. Such a deficit can be attributable to combined effect of post-extraction bone resorption and of maxillary sinus expanding. Examining different clinical situations that can be found out Misch (1) has identified four classes:

CLASS I
More than 12 mm of bone availability. In these cases is possible to introduce fixture of right dimensions according to the usual techniques.
CLASS II
Bone availability included between 12 and 8 mm. In these cases short fixtures could be introduced but is advisable to start begin sinus lifting using not invasive techniques in order to introduce longer fixtures.

CLASS III
Bone availability included between 8 and 5 mm. In these cases it is necessary to obtain a greater lift of the floor sinus. The more used technique is the one with lateral approach described by Misch and Tatum (2, 3) followed by insertion of fixtures at the same time.

CLASS IV
Less than 5 mm of bone availability. In these cases is expected equally a sinus floor lift but with fixture insertion postponed after graft integration.

In that case the impossibility of obtaining a sufficient primary stability to gain osseointegration requires to postpone fixtures insertion. Primary stability and healing in absence of movements are strict conditions for obtaining the osseointegration (4-6). Without these conditions a fibrous connection can occur instead of osseointegration (7-9). In order to reduce treatment length and number of surgical stages some authors have proposed to solidarize the fixtures between them to eliminate their mobility. Cranin and Russel in 1993 (10) successfully used a Leibinger splint for stabilizing stability-free fixtures introduced after sinus lifting, obtaining a clinical success. Sontheimer in 2000 (11) and Vollmer in 2002 (12) proposed, to the same aim, the use of mini-plates for osteosynthesis. Patyk et al. in 2000 (13) developed an extrasinusual stabilizer plate made of a resorbable material (polilactate). Engelke in 2002 (14) stabilized single fixtures lacking primary stability with osteosynthesis plates welded to a screwed abutment obtaining osseous regeneration and osseointegration in domestic pigs. Lindorf and Müller-Herzog proposed in 2004 (15) the ASIS technique consisting in using a block of cortical bone coming from the mandibular ramus like an extrasinusual fixture stabilizer in association with a sinus lift. With the same purpose Lang in 1999 (16) realized a titanium plate, later described, specifically destined to stabilize dental implants. Positive results with the same device thought out from Lang were obtained by Kaps in 1999 (17) and in Italy, by Morlino in 2000 (18).

Case report

In the January 2006 patient M.U. was examined, masculine sex, years 66, nonsmoker. The medical case history revealed absence of active pathologies. During the examination it was found out the loss of 17, 16, 15 e 36 with atrophy of the edentulous ridge Class IV of Misch, tooth 14 with grade 3 mobility, teeth 37 and 38 mesially tilted with periodontal compromission, teeth 18 and 28 retained, previous mandibular fracture with loss of 31. The patient refuses extractions of 18, 37, 38. Etiological therapy was chosen followed by extraction of 14 and implant supported rehabilitation in zone 16, 15, 14, without extraction of 18, with contemporary maxillary sinus lift DX (Fig. 1).
Methods

In this IV Class of Misch case, in order to permit fixtures insertion and sinus lift at the same time, it is decided to solidarize the fixtures, lacking primary stability, by means of S.I.S. plate (Sinus Implantat Stabilisator, Mondeal Medical Systems GmbH, Germany - Tuttlingen, distributed in Italy from Geass srl, Italy - Pozzuolo del Friuli) thought out from Lang (16). This device is made of a titanium plates of 0,6 mm thickness (Fig. 2) bringing greater holes, destined to screw the cover screws into the fixture, alternated at smaller holes destined to fix it to the osseous ridge by means of osteosynthesis screws and dedicated tools (Fig. 3) (Syntesis, Geass srl, Italy - Pozzuolo del Friuli). That plate has three presetted holes for the first premolar, the second premolar and the first molar. It is produced in two dimensions, to fit different types of fixture with different types of connections, and in two shapes, straight and curve, to fit different shapes of edentulous ridge. The procedure is carried out 40 day after tooth 14 extraction. The pharmacological therapy is 2 gr of Amoxicillin and Clavulanic Acid. Anesthesia is obtained by blocking the greater palatine, the inferior-orbital nerve and infiltrating the tuberosity region. A crestal incision is made in association with two mesial and distal releasing incisions. After that a buccal window is made with multiblade burs at first than with diamond burs in the final phase. Than the buccal window and the sinus membrane are raised with the usual manual tools, alternating the surgical movements with pauses in order to of to verify the synchronous membrane motion the with the respiratory actions. After obtaining the needed volume and verifying membrane integrity, an initial filling up is managed with heterologous bone (Bio-gen, Bioteck, Arcugnano - Italy) and clot of the patient previously drawn. A 5 mm diameter 13 mm length fixture (Hexa, Geass srl, Italy – Well of the Friuli) is firstly introduced in 14 post extraction socket. After fixing and moulding the S.I.S. plate onto the 14 fixture, two guiding holes are made fitting the plate holes in 15 and 16 position. Than the plate is removed, drilling 15 and 16 holes finished and two 3,75×13 mm fixtures (Hexa, Geass srl, Italy - Pozzuolo del Friuli) are installed. After their insertion the position 15 and 16 fixtures are lacking primary stability (Fig. 4). The three fixtures are now tightly solidarized between them and to the S.I.S. plate by means of the cover screws and to the osseous ridge by osteosynthesis screws (Figs. 5, 6). At the end the fixture-plate complex is totally still and rigidly joined with the ridge. Finally filling is completed up with the same biomaterial and covered with a collagen membrane (Biocollagen, Bioteck, Arcugnano - Italy) and a sutures is performed made of single and mattress stitches (supramyd 4-0, Butterfly...
Italy S.r.l. - Cavenago). The second procedure carried eight months after the first surgical time out. By means of slightly palatal incision a split-thickness flap is raised and a large band of keratinized gum is moved vestibular. Cover screws are removed as well as osteosynthesis screws and the S.I.S. plate (Fig. 7). After screwing of healing abutments a single stitches suture is performed (supramyd 4-0, Butterfly Italy S.r.l. - Cavenago). When healing is completed a fixed prosthesis is set (Fig. 8).

**Discussion**

6 (Fig. 9) and 12 (Fig. 10) months after loading radiographic assessments testify stability of the bone levels in line with the literature success criteria. The technology described seems to be able to ensure the success in IV Class of Misch with
dental implants insertion at the same time. In comparison with similar techniques it seems to be simpler and more reproducible, less operator related (10-14) and less harmful (15). A potential limit is the S.I.S. plates conformation, that does not permit insertion of the second molar when primary stability is lacking, and does no permit correction of horizontal defects and coronal augmentations. It would be useful to change the shape of the plates in order to permit second molar insertion and insertion of osteosynthesis screws not only along the plate central axis but also in palatal and buccal positions.

**Conclusion**

The described technique permits obtaining an immediate dental implants stabilization in IV Classes of Misch. This result allows to reduce considerably treatment length. Positive results 12 months after loading, are in line with the literature success criteria and with the few specific literature. This technique is simple and reproducible avoiding further traumas. The literature up till now available about this technique is limited and mostly based on case reports. A further investigation on larger number is needed.

**References**

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Case report


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