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Case reports

SUB-CRESTAL IMPLANTS WITH PLATFORM-SWITCHING AND ONE TIME ABUTMENT

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ABSTRACT

The use of dental implants in the rehabilitation of partially or fully edentulous patients is a treatment that has been validated over the last 40 years, with a high success rate. The introduction of platform switching, i.e. the use of abutments with a smaller diameter than the implant neck, has also resulted in an important benefit in terms of biomechanical behaviour, influence on crestal bone and peri-implant soft tissue response. A series of cases using BioPlatform GTB implants in different situations is presented.

KEYWORDS: *short implants, platform switching, one time abutment*

INTRODUCTION

The basis of medium- and long-term rehabilitation success in all implant systems is the integration of the abutment-fixture complex with the surrounding bone tissue. An integration that must be of sufficient quality and quantity and remain stable over time (1).

In particular, the clinical and radiological evaluation of marginal bone loss is considered one of the key factors for the stability and longevity of dental implants, as well as the maintenance of peri-implant soft tissue.

The establishment of a pathogenic microflora at the abutment-fixture interface, with the possible onset of mucositis, the increase in pocket depth and progressive bone resorption, as well as the role of excessive biomechanical stress due to incorrect occlusal loading, are related factors implicated in the loss of marginal bone around dental implants (2-5).

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Over the years, attention has been focused on the role of the position of the neck of the fixture in relation to the marginal ridge, the type, the geometry and the timing of the abutment-fixture connection. Several studies have focused attention on the role of the type of implant-abutment connection that can contribute to the stability of the peri-implant bone level; in fact, the geometry of the connection influences possible bacterial colonisation within the implants (6, 7).

The internal connection seems to show better results in terms of prevention of microbial penetration, resulting in a tight marginal seal and implant stability, thus preventing marginal bone loss (8-10).

Nowadays, the evaluation of those treatments in which abutments with a smaller diameter than the fixture have been used has revealed a better preservation of hard and soft tissues compared to treatments using abutments with similar diameters to the implant (2, 11, 12).

In recent years, developments in the macro-geometries of dental implants and prosthetic components have allowed a considerable increase in the biological performance of dental implants, with a paradigm shift in the surgical approach and implant-prosthetic rehabilitation (1).

The use of 'short' implants, < or = 6 mm in length, has thus become a predictable therapeutic alternative, capable at times of avoiding bone regeneration procedures that are certainly more complex, of longer duration and with a more uncertain or operator-dependent prognosis.

Research interest is therefore focusing on the comparison of marginal, heavily loaded bone with unfavourable levers and crown-radicular ratios (2:1 or more) (10-12).

Case 1

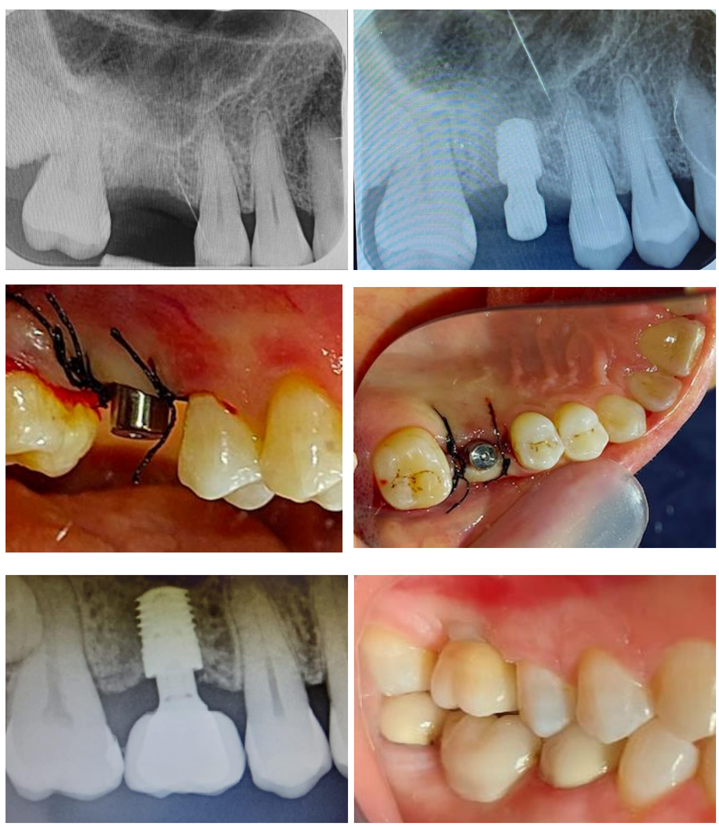
A female patient, 55 years old, non-smoker, with good oral hygiene control was admitted to our department. She had monoedentulous first upper right molar for more than 6 months. On radiological evaluation with TCCB, she had 7 mm of bone thickness in the buccal vestibular direction and a distance of 6 mm from the lower sinus floor. The proposed treatment plan was the insertion of a 4.3 mm diameter and 6 mm long GTB implant fixture, after transcrestal sinus elevation.

The surgical planning was carried out according to the surgical protocol for GTB implants, which provides for the eventual reduction of the 'knife-edge' ridge, the placement of fixtures according to the prosthetic axis, and the placement of the implant at a subcrestal level of at least 1.5 to 2 mm.

This planning was then performed surgically according to protocol, achieving a screwing stability of 25 Ncm. At the same time, the healing abutment GFA, with a height of 4.5 mm, was placed over the fixture.

After 60 days, and radiographic control, the impression was obtained was taken by unscrewing the healing abutment of the GFA according to the "one time abutment" protocol, screwed with a torque of 25 Ncm according to the GTB prosthetic protocol. The definitive polyether impression by using a transfer screwed directly onto the GFA abutment; a metal ceramic crown was then delivered.

At check-up 6 months after definitive loading, the bone closure on the neck of the abutment is complete, visible both radiologically and by the absence of probing.



Case 1.

Case 2

A 54-year-old male patient presented with mono-edentulous zone 2.4, an endosseous implant was inserted with a diameter of 3.3 and a length of 10 mm, but when the prosthetic abutment was tightened to about 25 N the implant fixture rotated. It was decided to carry out a new osseointegration but after 3 weeks a mucositis and peri-implant resorption process appeared. It was decided to remove the implant and proceed with a new contextual insertion. We chose the insertion of a GTB 3.3 10 mm implant with subcrestal placement, to achieve primary stability and optimal healing of the peri-implant mucosal tissue thanks to the use of the GFA component and the one-time abutment. A good healing of the hard tissues and the peri-implant marginal mucosal tissues with satisfactory pink aesthetics and bone stability was obtained at the time of the final radiographic check (70 days).

Case 3

A 60-year-old female patient presented with periodontal compromised tooth 4.7 such that extraction was necessary. After three months a GTB 4.3 x 7.5 mm length implant fixture was inserted and a 3.5 mm GFA placed. Two months after the surgical phase an impression was taken and a definite crown was inserted, following the indications for a pontic crown that maintains the stability and quality of the keratinized gingiva. There is excellent integration both with the surrounding teeth (white aesthetics) and in the stability of the peri-implant soft tissue (pink aesthetics).

Case 2.

Case 3.

Case 4

A 30-year-old patient with mono-edentulous zone 1.2 due to a previous root crown fracture presented to us for prosthetic rehabilitation. He had a thin biotype and the smile-gum which makes both implant insertion and the aesthetic result very difficult. It is decided to insert a 3.3-diameter and 9-mm-high implant with 3.5-mm GFA. At the end of the surgical phase, a corrected positioning of the GFA level with the gingival margin but after waiting for the osseointegration phenomenon and at the moment of taking the impression the gingival margin seemed to have migrated apically requiring a substitution of a 2 mm GFA abutment.

After the correct selection of the GFA the temporary crown has integrated correctly with the peri-implant soft tissue with an aesthetic result satisfactory.

Case 4.

DISCUSSION

Marginal bone loss around dental implants has been attributed to several factors. It may be the result of the establishment of a pathogenic microflora, which promotes the onset of peri-implant disease with mucosal inflammation, increased pocket depth and progressive bone resorption. Other studies have suggested that changes in marginal bone level may be the result of biomechanical stress due to incorrect occlusal design (6, 9, 13, 14).

Crestal bone loss may be the physiological result of incorrect three-dimensional positioning of the fixture. The coronal portion of the bone may tend to resorb if the fixture is placed too close to adjacent teeth/implants or a thin residual buccal wall (10, 15).

Subcrestal placement of the implant platform may negatively influence the stability of the peri-implant marginal bone. Crestal bone resorption is also related to the presence of a microgap between implant and abutment and the position of this microgap in relation to the crestal bone level.

The microgap, the micromovement between the fixture and the abutment, and the presence or absence of the switching platform are therefore considered the main factors in marginal bone resorption (2, 5, 9, 12).

Respect of the surgical protocol with a subcrestal positioning and a screwing torque of the implants that is not excessive and the control of the implant insertion axis, which must be as coincident as possible with the prosthetic axis, are key factors in the long-term success of implant rehabilitation (1, 10).

CONCLUSIONS

A conical or cono-morse implant-abutment connection allows subcrestal placement of the fixture, with a substantial reduction in the risk of microbial colonisation and/or micromovement, both negative prognostic factors for marginal bone maintenance.

It is even more evident how the use of abutments with a smaller diameter than the fixture (platform switching) and their early and single insertion (one-time abutment) both contribute to preserving the mucosal bone tissue complex around the implant, positively influencing the prognosis and success of therapy (1, 16, 17).

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