original article

IMMEDIATE LOADING: A NEW IMPLANT TECHNIQUE WITH IMMEDIATE LOADING AND AESTHETICS: NOBEL ACTIVE™

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SUMMARY

Immediate loading: a new implant technique with immediate loading and aesthetics: Nobel Active™

The aim of this study is to evaluate the short time aesthetic and functional outcome of a new implant system, the Nobel Active™. The Nobel Active™ features several innovations such as an extensive self-drilling capacity, axial and radial bone compression and an inward tapered collar allowing for marginal bone maintance an soft tissue stabilization. This design makes it possible to place the implant into narrower osteotomies, thus requiring less drilling, compared to conventional implants. The Nobel Active™ implants are available in two different prosthetic connections: Internal connection and external connection. The Nobel Active™ External connection is a 1.5 piece implant, with a primary abutment included with the implant. The Nobel Active™ internal connection is a two piece implant with a standard hexagonal internal connection. In this study we present a single tooth replacement with immediate loading of Nobel Active External connection.

Key words: osseointegration, immediate loading, Nobel Active™.

RIASSUNTO

Il carico immediato: una tecnica implantare con estetica e funzione immediata: Nobel Active™

Scopo di questo studio è valutare a breve termine l'esito funzionale ed estetico di una nuova sistematica implantare, il Nobel Active™, le cui caratteristiche innovative rappresentano un grande passo in avanti rispetto agli impianti tradizionali. Le sue peculiarità, quali, un'elevata capacità auto-filettante e di compressione ossea assiale e radiale, il collare conico verso l'interno, disegnato per una maggiore stabilizzazione dei tessuti molli e per il mantenimento dell'osso marginale, la superficie TiUnite®, arricchita da numerose porosità sulle spire, insieme al suo disegno, rendono possibile un facile raggiungimento della stabilità primaria ed il posizionamento della fixture anche in mascellari fortemente riassorbiti, in quanto Nobel Active™, rispetto alle tecniche tradizionali, richiede una minore osteotomia. Questo sistema, inoltre, prevede due soluzioni protesiche differenti: internal od external connection. Il Nobel Active™ External prevede una moncone primario fuso con l'impianto (one piece) sul quale andrà ad incastrarsi, mediante la sua interfaccia concava, l'abutment definitivo. Il Nobel Active™ Internal invece, presenta un classica interfaccia protesica ad esagono interno. In questo studio viene presentato un caso clinico con carico immediato di Nobel Active™ External, esaltandone l'estrema semplicità operativa nelle fasi chirurgiche e protesiche ed il ripristino funzionale ed estetico immediato.

Parole chiave: osteointegrazione, carico immediato, Nobel Active™.

Introduction

Today, immediate loading is one of the most important objective of the implant-prosthetic technique. The osseointegration, documented by now from the operators of the whole world, has allowed the realization of fixed prosthesis in patients where, up to few years before, it was nearly impossible to furnish some acceptable and comforting solutions. The success of osseointegration, however, results conditioned by the rig-

orous respect of the long healing time that was thought to be necessary to avoid the fibrous connective tissue interposition in the bone-implant interface (1). This causes a considerable discomfort in the post-operating period and sometimes it can even dissuade the patient to take the surgery, so it can be considered a serious limit. For this reason, the possibility to shorten the time that elapse between the surgical phase and the delivery of the fixed prosthesis has been studied more and more, leaving the Brånemark (2) classic protocol and it's rigid criterions according to which, to achieve a correct osseointegration, we had to attend at least three months for the mandible and four-six months for the jawbone. The measurement with frequency of resonance of implants bone anchorage (9) has recently confirmed that, in high density bone, implant stability doesn't increase during the healing phase. So if we have since the beginning a good stability, we can realize immediate loading with success (4). While, in low density bone, implant stability increases during the healing phase, thanks to bone regeneration around the implant, just in these cases we have to accord to Brånemark classic protocol (5). In a lot of clinical situations, osseointegration can be therefore considered as the maintenance of an elevated primary bone anchorage, rather than its formation. Just in these cases immediate loading can be applied with success. It is opportune remember that the immediate loading of implants, besides allowing a reduction of the times of the rehabilitation, it represents a great psychological and functional advantage for the patients. Recent studies on the immediate loading of single implants and bridges in both the maxillary show as, previous a careful clinical evaluation of the patient and the use of a correct surgical protocol, the obtained results are completely comparable to those obtained with the standard loading protocol (3, 6, 8, 10). The possibility to functionally and aesthetically rehabilitate the patient within an only appointment, without rehabilitation quality loosing, represents therefore the ideal solution and the made attempts in the last years by the operators are strongly addressed in this direction.

Nobel Active™

The Nobel Biocare™ AB, to achieve these results, has developed a new implant-system with an innovative design: Nobel Active™. It has been created by four dentist of international renown: Dr. Benny Karmon, Dr. Yuval Jacoby, Prof. Nitzan Bichacho and Dr. Ophir Fromovich. Nobel Active™ several innovation can be found as in implant macrostructure as in implant microstructure.

These implants have a variable thread profile that becomes wider (vertically) and shorter (horizontally) as it progresses coronally. These implants have a variable tapered thread-profile and the core of the implants forms condensing cones and not continuous lines like the body of conventional tapered implants. In the apical region the implants have a pronounced tapered body with sharp threads to facilitate insertion and cutting unprepared bone. This part of the implant is followed by a sequence of variable threads-units to allow easy insertion together with gradual condensation to achieve excellent primary stabilization even in very low density bone. The implants also have a spiral tap extending along more than half of the implant length that increase the penetrability of the implant. The coronal region adjacent to the threaded part (the collar) of the Nobel Active™ (Rp and Wp) is tapered coronally allowing elastic relapse of the bone over the implant, while the Nobel Active™ Narrow platform has a straight collar.

The nobel Active™ implants are available in two different prosthetic connections: Internal connection and external connection.

The nobel Active™ internal connection is a two-piece implant available in diameters of 3,5 mm (Np), 4,3 mm (Rp), 5,0 mm (Wp).

It can be used for every quality of bone, as in the mandible as in the jawbone and for full-arch fixed restoration, partial fixed bridge or single tooth restoration. It can be used as in the two-stage protocol as to realize immediate loading.

These implants have an internal hexagonal prosthetic connection that exclude the existence of

microgap and allow a correct prosthetic connection.
The Nobel Active™ external connection is a one-piece implant that take advantage of all the mechanical and biological benefits of a one-piece implant and still maintain the flexibility of a two-piece system. It can be available into three diameters: 3,5 mm (Np), 4,3 mm (Rp), 5,0 mm (Wp). Abutments are friction secured to the implant shank by tapping with a mallet and removed from it with the abutment removal screw.
Abutments are connected by a locking tapered interface to this part of the implant.
From a micro structural point of view, the surface of the whole threaded part of the implant and the collar is TiUnite™ . In the Nobel Active External, the most coronal, transmucosal part of the implant, has a machined surface. Results of resonance frequency analyses (7, 11) show that the high initial stability achieved with TiUnite® surface is maintained at a high level throughout the healing phase and up to 30% higher stability than machined surface implants.

Clinical case

Male patient 27 y.o. with missing first premolar 1.4 due to trauma (Fig. 1) 2 years eralier, was threated with Nobel Active™ external connection implant system. After clinical and radiographic evaluation (Tc Dentascan (Fig. 3), panoramic (Fig. 2) and with approval from the patient, we decided

Figure 1
Pre-operatory view.

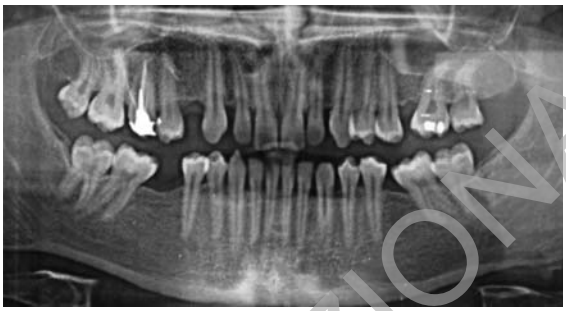

Figure 2
Panoramic.

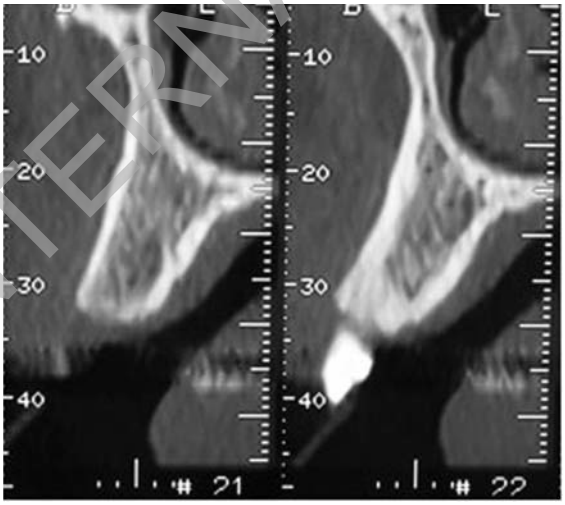

Figure 3
TC Dentascan.

to use the Nobel Active™ implants with external connection. We used a flap surgery technique (Fig. 4) with loading within 24 hours. The surgical drills that we used were as follows: twist drill Ø 2 mm, twist step-drill Ø 2,4/2,8 mm and twist step-drill 3,2/3,6 mm. The implant, a Nobel Active™ 4,3 × 13 mm was inserted at low speed of 25rpm and with a torque of 40 Ncm. The suture that we used was Seta Ethicon 3.0. Temporary crown was placed on top of the healing abutment (Fig. 5, 6). Final prosthetic solution (Fig. 10-12) was fabricated after 3 months, using traditional impression technique (Fig. 7-9). Regular check ups at 3, 6, 12 months have showed an excellent bone healing (Fig. 13).

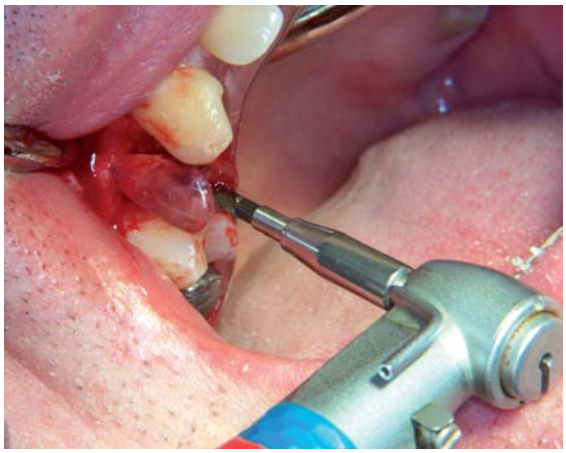

Figure 4
Surgical stent and twist drill.

Figure 5
Healing abutment on top of the fixture.

Figure 6
Temporary crown. Buccal view.

Figure 7
Transfert connected to the fixture.

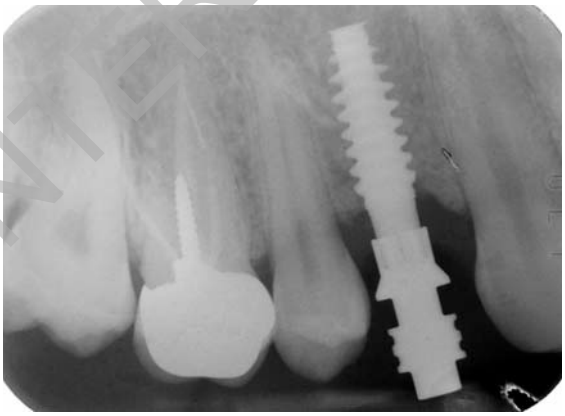

Figure 8
Rx of transfert connected to the implant.

Conclusions

Scientific articles reviewed in the last years, acknowledge immediate loading as a valid treatment alternative with the predictable results as the Brånemark standard protocol with the benefits of shorter treatment time and less dental appointments.
Since the immediate loading protocol is less traumatic and shows good results with less treatment time, without any doubt it will be well accepted by patients and therefore used in more patient treatments.

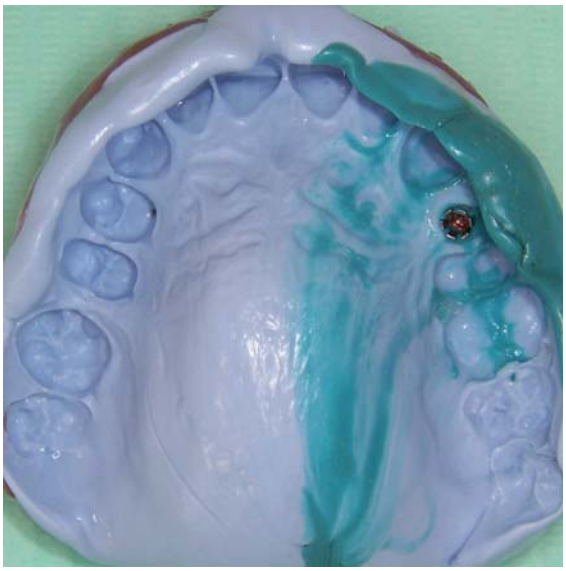

Figure 9
Final impression.

Figure 10
Final prosthetic titanium-porcelain crown. Occlusal view.

Figure 11
Final prosthetic titanium-porcelain crown. Buccal view.

Figure 12
Final prosthetic titanium-porcelain crown. Frontal view.

Figure 13
Rx 1 year follow-up.

The author's opinion is that Nobel Active™ represents an important mile stone for immediate loading, but more clinical studies should be done to improve this technique.

References

1. Albrektsson T, Zarb G, Worthington P, Eriksson RA. The long-term efficacy of currently used dental implants: A review and proposed criteria of success. Int J Oral Maxillofac Implants 1986; 1: 11-25.
2. Brånemark PI et al. Scandinavian J. Of Plastic Reconstructive Surgery 1977; 16: 1-132.
3. Ericsson I, Nilson H, Lindh T, Nilner K, Randow K.

Immediate functional loading of Branemark single tooth implants. An 18 months' clinical pilot follow-up study. Clin Oral Impl Res 2000; 11: 26-33. Munksgaard 2000.
4. Friberg B, Sennerby L, Meredith N, Lekholm U. A comparison between cutting torque and resonance frequency measurements of maxillary implants. A 20 – month clinical study. Int J Oral Maxillofac Surg 1999a; 28: 266-272.
5. Friberg B et al. Int J Oral Maxillofac Surg 1999b.
6. Glauser R, Ree A, Lundgren A, Gottlow J, Hammerle CH, Scharer P. Immediate occlusal loading of Branemark implants applied in various jawbone regions: a prospective, 1-year clinical study. Clin Implant Dent Relat Res. 2001; 3 (4): 204-13.
7. Huang YH, Xiropaidis AV, Sorensen RG, Albandar JM, Hall J, Wikesjo UM. Bone formation at titanium porous oxide (TiUnite) oral implants in type IV bone. Clin Oral Implants Res. 2005 Feb; 16(1): 105-111.
8. Hui E, Chow J, Li D, Liu J, Wat P, Law H. Immediate Provisional for Single – Tooth Implant Replacement with Branemark System: Preliminary Report. Clinical Implant Dentistry and Related Research, Volume 3, Number 2, 2001.
9. Meredith et al., 1997; Friberg et al., 1999.
10. Rocci A, Martignoni M, Burgos PM, Gottlow J, Sennerby L. Histology of retrieved immediately and early loaded oxidized implants: light microscopic observations after 5 to 9 months of loading in the posterior mandible. Clin Implant Dent Relat Res 2003; 5 Suppl 1: 88-98.
11. Rocci A, Martignoni M, Sennerby L, Gottlow J. Immediate loading of a Brånemark System implant with the TiUnite Surface. Histological evaluation after 9 months. Applied Osseointegration Research 2002; 3 (1).

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