Bicortical Screw and Needle Welded Together as Effective Implant Technique for Immediate Load of SINGLE Tooth in Aesthetic Zone Characterized by Severe Bony Reabsorption: Cases Report

Luca Dal Carlo, Marco E. Pasqualini, and Franco Rossi

ABSTRACT

After a long period of time in which submerged implants were used just with delayed load, scientific evidence has led to immediate loading, finally re-evaluating the long lasting experience gotten with one-piece implants.

In aesthetic area, if bone is deep and wide, immediate load can be performed with any type of implants, with scarce risk of failure.

Situations in which bone is scarce are frequent and impose to choose between performing a suitable technique compatible with immediate loading or renouncing to immediate loading.

In our experience, implant technique based on the welding-in-mouth of a titanium needle to main implant is regularly destined to success, because the needle implant, deeply anchored to bone, compensates the lateral forces that normally push the tooth forward.

The long lasting experience accrued since over 30 years in our professional offices leads us to suggest this technique as a standard solution while dealing with bone reabsorption in the aesthetic area. We are certain that further studies will confirm our conclusions.

Keywords: Immediate implant, Aesthetic area, composed single implant, Welding machine.

I. INTRODUCTION

The occurrence of periodontal disease and bone reabsorption around a tooth of the aesthetic zone is often accompanied by lack of alveolus surrounding cortex walls and, therefore, immediately loaded root-form implants are contra-indicated. As a matter of fact, in such conditions, risk of failure is high, also taking into consideration the fact that superior incisors are pushed forward by inferior ones. Bony augmentation is a slow speed technique, useful to restore volume, but useless, in the first phase, to bear lateral load effort. In addition, acceptance of grafted bone depends on numerous factors, including reactivity of the residual natural bone in which lied the affected natural tooth. This acceptance is often unpredictable. Due to these assessments, bone graft is normally followed by 4-6 months of wait before loading [1], [2].

When immediately loading the implant, success is entrusted on residual native bone.

II. TALKING WITH THE PATIENT

Former considerations are related to patient’s requests, which can exclude therapy. As a matter of fact, if we understand that satisfying patient wills will increase failure risks, we must give up. This situation is not so rare. Many times, patient is bearing diseased teeth, which have damaged supporting bone and he/she wants immediate fix tooth with same or increased volume. It is therefore important to understand the causes of previous tooth failure, being aware that an implant, especially early after intervention, must be gently handled. Detecting occlusal dynamics which could jeopardize implant stability is a key factor for success (Fig. 6) [3], [4].

To apply immediate loading after extraction in situations in which bone is reabsorbed, it is necessary to use an implant technique capable to provide immediate stability of the little implant part anchored to bone. We cannot use a standard technique, but, on the contrary, an implant technique based on anatomic residual recesses and human skill.
III. THE STABILIZED SCREW TECHNIQUE

If immediately loaded, a single screw inserted in scarce bone in the anterior superior maxilla can go to failure due to minimum trauma or incongruous function. Numerous studies have demonstrated that, in majority of cases, buccal bone thickness is less than 1 mm [5]. If, in addition, bone depth is poor, such therapy is a gamble easy to lose.

A technique which combines immediate loading with high rate of success is then needed.

If patient request is immediate loading, we can take into consideration the classical implant technique based on the welding-in-mouth of a needle implant (secondary implant) firmly anchored to the deep cortex to the screw (main implant). This proceeding provides, since the beginning, a stable single unit titanium structure. This technique was introduced to implant practice during the early 80ies [6]-[8]. This technique is resolving not only the bone reabsorption problem in height, but the frequent situation of lack of parallelism, too. As a matter of fact, bone deficit leads to insert main implant on one side and not in the ideal position (Fig. 1, a). By exploiting bone located deeply in the mediial posterior pre-maxilla, the needle implant provides immediate stability to main implant, to which it has been welded immediately after extraction. As a matter of fact, titanium needle can be deeply inserted reaching the bony cortex of the nose, behind the alveolar process of pre-maxilla, with the additional effect of increasing crown root ratio. During the first post-intervention period, the implant which is guaranteeing stability is the secondary one (Fig. 1, b). We can then plan a project which allows the patient to be immediately restored by means of a fixed provisional prosthesis.

Fig. 1. (a) The screw implant exploits the residual bone in one side, while the needle implant reaches the nose cortex posteriorly, increasing crown-root ratio. (b) In a sagittal view, it is easy to understand the ratio of this technique. (c) Same concept is applied to stabilize weakly rooted trees protecting them from the lateral force of the wind, till the roots grow, reaching enough depth.

IV. TREATMENT PLANNING

Decision of adding a welded implant must be taken before the beginning of the intervention, so as to manage available spaces for the best. First hole must be the one for the main implant. After its positioning, a thin bur, 1.0 mm. wide (Maillefer torpans fit good), is used to perform a little hole in the cortex of the alveolus, with posterior direction. Needle titanium implant is then inserted, progressing with slow rotation, and checking its final bicortical position by gentle hammering. After an X-ray control, the two implants are welded in mouth (Fig. 4 and 11). A provisional crown in adapted with resin and the occlusal functions are checked. The crown is then cemented, and the patient can go home with his new tooth in mouth.

The provisional prosthesis must be cautious, taking care of eliminating all the risks of displacing forces (Fig. 8, d). This precaution is mandatory, because, during the first period after intervention, stable implant-bone interface is lacking. After osteo-inclusion implant will be capable to bear stronger forces, which, anyway, must be well managed.

V. CLINICAL CASE I

Patient BF, male, aged 48. Being edentulous in the left posterior sectors, patient had been previously treated with implants in the left superior and inferior sector (Fig. 2). After left side treatment completion, resolving fractured 1.2 was necessary. In this kind of cases, it is immediately comprehensible that the buccal wall of the bone is completely lacking, irreversibly damaged by inflammation and incongruous occlusal forces. Occlusal trauma during clenching and protrusion was confirmed by simply observing the tooth moving during these cited functions (Fig. 3, a). Patient rejected any removable prosthetic solution and requested immediate fixed prosthetic crown.

Fig. 2. Pre-Operatory OPG.

Treatment planning was conceived and illustrated to the patient (Fig. 3, c). Scarceness of bone imposed the use of implants capable to exploit the poor residual bone. Bicortical screw implant stabilized by means of bicortical needle implant was then selected as the solution provided by the best immediate stability. Intervention was described, including the need of weld immediately the two implants together in patient mouth. Immediate temporary prosthetic crown was then discussed, explaining the need of slightly modifying the antagonist teeth so as to minimize the risk of traumas to the provisional tooth. It must be underlined that, any cause of tooth failure, the lack of buccal bone deprives the implant of the means with whom anterior forces are counterbalanced.

A. Intervention

Immediately post-extractive implant was planned. Local anesthesia with adrenaline 1/100,000 was performed in both buccal and palatal sides. After having reached effective block, extraction of the tooth was performed (Fig. 3, b).
VI. CLINICAL CASE 2

Patient TP, age 55, male. Left incisor naturally expelled by occlusal trauma. Severe bone resorption (Fig. 6). Treatment by means of stabilized screw immediately loaded by means of provisional prosthesis. Definitive crown surrounded by good-looking healed tissues, despite immediate loading (Fig. 7).

VII. CLINICAL CASE 3

Patient RG, age 60, female. Fractured 2.3 root bearing crown with customized post since long time. Vestibular fistula testifies buccal bone loss. Bicortical screw and needle were inserted immediately after extraction and adequate surgical toilette. Implants were immediately welded in mouth [13]. Provisional prosthesis was cemented at end of intervention, taking care of avoiding displacing forces. After bone regeneration, definitive crown was built, recovering physiologic function (canine guidance) (Fig. 8).
VIII. CLINICAL CASE 4

Patient CG, age 52, female. Severe periodontal disease around 1.3, irreversibly damaged. Tooth extraction, provisional single crown out of function and subsequent definitive one. Definitive crown provides canine guidance (Fig. 9, 10).

IX. CLINICAL CASE 5

Patient FS, age 74, Female. Aching and moving superior central incisor, with horizontal tooth fracture. In this clinical case, same natural crown was used as provisional prosthesis [15], [16]. Patient then decided to hold on as definitive one. To recover same tooth position, the Jig Replace technique was used [15], i.e., adapting some resin or impression material to tooth and adjacent ones to repeat same tooth position. Tooth was removed, root scooped out to allow adaptation on implants. After careful surgical toilette, screw and needle were inserted immediately welded in mouth, and milled as prosthetic abutment. Natural crown was adapted with resin and cemented (Fig. 11).

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Dr. Luca Dal Carlo was born in Venice, Italy, on October the 16th, 1962. He was graduated in Odontology and Prosthetic Dentistry at the Padua University on March 29th, 1988. Since that time, he holds a private practice in center Venice, Italy. Over 30 years experienced in multi-modal implant dentistry, intra-oral welding, immediate loading and related prosthetics.

Dr. Pasqualini has a private practice in Milan, Italy as editorial advisor for the scientific journal Doctor Os as well as reviewer for the Journal of Osseointegration.

Dr. Marco E. Pasqualini was born in Modena, Italy, on March 17th, 1952. He attended the University of Milan, graduating with a degree in medicine, and then earned a postgraduate degree cum laude in dentistry at the University of Modena, Italy. He was non-tenured professor of clinical maxillofacial prosthetics at the School of Dentistry, which is part of the Department of Medicine at the University of Modena (academic year 1991–1992).

He held a non-tenured position with the Department of Medicine at the University of Milan, Italy, teaching "The role of plate-form implants in oral rehabilitation" as part of the coursework on oral diseases for the undergraduate program in dental hygiene (academic year 2001–2002).

He was also a non-tenured professor at the Department of Dental Sciences of the School of Medicine at the Gabriele d’Annunzio University of Chieti for the postgraduate course on clinical implantology and biomaterials (academic year 2004–2005) and the theoretical-practical refresher course on electrowelded implantology (academic year 2005–2006), both of which directed by Stefano Fanali, professor of dentistry.

Author and co-author of 84 articles that have been published in national and international scientific journals, he has a personal photographic archive about dentistry composed of more than 20,000 slides. He worked with his uncle, Prof. Ugo Pasqualini, for 20 years in both daily practice and research work, and shares his scientific principles, outlined in the book "Occlusal pathologies. Pathogenesis and therapy" (Italian).

He was vice president of A.I.S.I. (Italian Academy of Implant Stomatology), and he is a GISI (Italian Implant Study Group) fellow and a charter member of COM (Cenacolo Odontostomatologico Milanese).

He was member of the board of directors of GISIGM (Giordano Muratori Italian Implant Study Group), directed by Prof. Francesco Mangini of the University of Bari.

He has been president of the SOMECOI (Società Medico Chirurgica di Odontotratia Implantoprotesica) since 1999 and is a charter member of AIIP (Academia Internacional de Implantologia y Periodoncia).

He is Master AAIP (American Academy of Implant Prosthodontics) and active member of ICOI (International Congress of Oral Implantologists) and SEI (Sociedad Española de Implantes).


As national and international lecturer, he has taught postgraduate courses for updates on implantology and occlusions.