CLINICAL STUDY OF NATURACTIS DENTAL IMPLANTS IN POST-EXTRACTION DENTAL PROCEDURES.

Authors: Antonio Bascones-Martinez,* Jorge Ripollés-de Ramón**, Rafael Gómez-Font ***, Cristina Bascones-Illundáin****, Jaime Bascones-Illundáin*****

*Full Professor, Head of Buccofacial Medicine and Surgery Department, School of Dentistry, Madrid Complutense University, Spain.
** Doctor in Dentistry. Buccofacial Medicine and Surgery Department, School of Dentistry, Madrid Complutense University, Spain.
*** Professor Odontology, Buccofacial Medicine and Surgery Department, School of Dentistry, Madrid Complutense University, Spain.
**** Professor, Odontology, Buccofacial Medicine and Surgery Department, School of Dentistry, Madrid Complutense University, Spain.
***** Professor, Odontology, Conservative Department, School of Dentistry, Madrid Complutense University, Spain.

Corresponding author:
Prof. Antonio Bascones-Martinez
antbasco@odon.ucm.es
Facultad de Odontología
Plaza Ramón y Cajal s/n
Madrid 28040, Spain
INTRODUCTION

Immediate post-extraction implant placement has been developed over the past 20 yrs (1-8) with the aim of reducing implant treatment time, avoiding the resorption of alveolar structures and maintaining the greatest possible integrity of hard and soft tissue in the alveolar process, which tends to decrease in volume post-extraction. This approach is closely related to the application of tissue regeneration techniques to manage gaps between the alveolar socket and implant, thereby avoiding the migration to these areas of epithelial cells and their potential interference with osseointegration (9-14). Among the limitations and indications of immediate implantation, it requires a minimal remnant bone volume for the vestibular and palatal walls of the socket and adequate healthy bone apical to the implant site (15,16).

Numerous studies have demonstrated the predictability and safety of post-extraction implant placement; it achieves success rates similar to those obtained with a deferred surgical approach, and the substantially reduced treatment time undoubtedly improves patient satisfaction (17,18). However, this technique is not free of complications, especially when incorrectly applied, and it should be performed in a meticulous and precise manner. The most common cause of failure is alveolar infection, which leads to implant loss in the majority of cases.

HYPOTHESIS AND OBJECTIVES

The macro- and micro-mechanical morphology and design of Naturactis implants favor their positioning and stabilization within the tooth socket, especially in post-extraction procedures. The simplified surgical protocol facilitates the implant insertion and minimizes the damage to periodontal tissues.

The objectives of this study were: to evaluate the degree of primary stability after implant placement; to evaluate the success rates of Naturactis implants at 6, 12, and 18 months post-insertion; to analyze the peri-implant periodontal tissue; to assess the peri-implant appearance; and to evaluate the degree of satisfaction of the clinicians with the management of the implant and the surgical protocol.
MATERIAL AND METHODS

Volunteers for this prospective longitudinal clinical study were recruited from among the patients of private clinics in Madrid.

Study inclusion criteria were: age between 18-65 yrs; good general health status; fulfillment of clinical criteria for tooth extraction (e.g., periodontal disease, root fracture, external or internal root resorption, or endodontic treatment failure) in the interval 15-25, 35-45, i.e., in upper or lower arch in positions between the premolars; no signs of dental-periodontal infection, no presence of granuloma or fistula in the socket, and the fulfillment of criteria for immediate post-extraction implantation, including ≥ 1 mm vestibular or palatine bone in the alveolar process; and a minimum of 3-5 mm healthy bone apical to the extracted tooth (i.e., implant placement area).

Study exclusion criteria were: treatment with > 3 drugs or with drugs that can affect bone regulation metabolism (bisphosphonates) or alter coagulation or vit K parameters; any type of allergy; pregnancy or breastfeeding; consumption of ≥ 10 cigarettes/day; presence of dyscrasia syndrome or psychiatric disorder; and alcohol intake in the previous 7 days. After application of the above criteria, a study sample of 33 patients requiring a total of 60 implants was enrolled in the study. After the implantation, a further criterion for exclusion from the analysis was an initial torque value below 35Nm (see below) in cases with a gap between implant and socket space > 1 mm. No such cases were observed.

Written informed consent was obtained from all participants, and the study was approved by the research ethics committee of the San Carlos Hospital in Madrid on July 11 2012 (code CP CI 12/268E).

Methodology and surgical technique

A panoramic radiograph was taken of each patient enrolled in the study, and a block of Godiva modeling wax was prepared (engraved with the patient’s initials) (Fig. 1).
Next, a periapical radiograph was taken with the prepared wax block in place. Before the surgery, a baseline photograph was taken (Fig. 1).

The surgical technique was designed to be as atraumatic as possible and to maximize the preservation of the periodontal bone structure. Alveolar curettage was conducted in order to eliminate all pathological material. Immediately after the extraction, a Naturactis dental implant (internal connection) was placed, following the drilling sequence recommended by the manufacturer (Euroteknika Groupe Sallanches, France). All implants were placed with a healing screw at the minimum height required for its exposure, permitting subsequent measurements with the Osstell system (Osstell ISQ Instrument, Linthicum, MD).

After the implant placement, the insertion torque was measured, and the implant stability was determined in ISQ values using the Osstell system (Fig. 2). In addition, a parallel periapical radiograph was taken, using the aforementioned wax block to ensure the same projection and thereby allow crestal bone changes to be accurately followed over time (Fig. 3). Finally, a photograph was taken of the same image as in the baseline photograph but with the implant and healing screw in place (Figure 4).

Patients were treated with 500/125 mg amoxicillin/clavulanic acid (1 tablet every 8 h) for 7 days post-surgery and with anti-inflammatory analgesics during the first 24-48 h; the topical application of 0.20% chlorhexidine for 15 days was recommended. Sutures were removed at 7 days. A photograph was taken (Fig. 5), and the implant stability was measured with the Osstell system and periapical radiographs were taken at this follow-up and again at 2, 4, and 6 months.

RESULTS

In this study, 60 Naturactis implants were placed in 33 patients (12 males and 21 females) (Table 1). More than 50% of the patients were older than 54 yrs; the most prevalent age group was the 30-42 yr age group (Table 2). Out of the 60 implants, 80% were placed in maxilla and 20% in mandible (Table 3); 7% of the patients were smokers (< 10 cigarettes/day [heavier smokers were excluded]) (Table 4). Four of the implants failed and were removed: three of these were immediate or early failures (<30
days), and the fourth failed at 70 days (Table 5); three of the failures were in maxilla and the other in mandible. All four implants were reinserted within three months of the failure and were successfully loaded at six months.

The most frequent implant diameter was 4 mm (regular platform) (>50%), followed by 3 mm (35%), and 5 mm (wide platform) (Table 6). The insertion torque value of the implants was >35 Nm in all cases, with initial Osstell ISQ values that ranged between 64 and 92. There was a trend to a small reduction in ISQ values at 2 months post-loading, which was followed by an increase at 4 months; no significant difference was found between ISQ results at 4 and 6 months. No implant failure was observed at 12 months post-loading, when all patients were discharged from treatment.

DISCUSSION

Besides the shorter duration of the treatment, immediate post-extraction implant placement reduces the number of surgical acts and the exposure of the patients to drugs. The results obtained in the present study confirm that the success rates obtained with immediate implantation are similar to those achieved with deferred techniques (1-2, 23-25).

As reported by other authors, immediate implantation requires a meticulous surgical procedure and the application of rigorous clinical criteria, especially in regard to the primary stability, the absence of active infection, and the availability of adequate peri-implant bone. This technique is not free of complications, most frequently postoperative infection, which can lead to implant loss (3-7). Most authors consider that the main clinical requirement for success in immediate implantation is a high implant insertion torque, considering torque values > 35 Nm insertion and Osstell ISQ values > 65 to be adequate for a successful outcome (12, 15-17).

Most authors recommend avoiding the elevation of a mucoperiosteal flap in the implant placement area when possible, because it increases resorption of the underlying bone by altering its stability and nutrition. Blanco et al (26) observed that vestibular plate resorption was lower with flapless surgery (0.8 mm) than with surgery using a flap (1.3 mm). Hence, mucoperiosteal detachment may impair socket modeling.
post-extraction by producing an increase in osteoclast resorption. We highlight the importance of the vestibular wall width in immediate post-extraction implant placement. Thus, Chen et al (17,18) reported that the resorption was up to 3-fold greater in sockets with thinner walls (<0.5 mm).

CONCLUSIONS

Immediate post-extraction implantation is not free of drawbacks but has proven to be an effective and safe option in the majority of clinical situations that require tooth extraction. Naturactis implants demonstrate a high level of primary stability (initial Osstell values >63 ISQ), which is essential for immediate implantation and the key to a successful outcome.

No immediate or short-term complications were observed in any case, except for the early loss of four implants due to socket bed infection. No implants failed after their prosthetic loading.

Radiological studies verified the maintenance and integrity of the crestal bone at 12 months, in part attributable to the absence of mucoperiosteal detachment during the surgery.

The results at 6 months were satisfactory with regard to the implant insertion, stability, and surgical protocol management for implant placement. Studies are warranted with larger samples to compare Naturactis implants with other implant systems.
ABSTRACT

Background: The reported success rate of immediate post-extraction implantation ranges between 92.7% and 98%. Its main advantage is the shorter treatment time before prosthetic loading, and it also avoids a second surgery and improves the healing process. The objective of this study was to evaluate the outcome of immediate implantation using a specific type of implant.

Material and Methods: Sixty Naturactis implants (Euroteknika) were placed immediately after dental extraction in 33 eligible patients. Data were gathered on the age, gender, and toxic habits of patients and on the insertion torque, periodontal status, implant stability (Osstell system), and crestal bone resorption (radiological study). All patients were followed up for 12 months. Mucoperiosteal flaps were avoided in all cases.

Results: All implants achieved an insertion torque > 35NM and an initial stability >63 ISQ (Osstell system). Four of the implants failed within 1 month. No crestal bone loss was observed in the first 6 months post-implantation. Healing was uneventful and there were no postoperative complications.

Key words: Dental implants, immediate dental implants, immediate loading.
REFERENCES


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following immediate implant placement in the dog: flap versus flapless surgery. 
Figure 1.- Preparation of wax block
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