

IMPLANTS INSERTED IN POST EXTRACTIVE SOCKETS HAVE SURVIVAL RATES SIMILAR TO FIXTURES INSERTED IN HEALED BONE: A CASE SERIES STUDY

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Post-extractive implants (i.e. PEIs) are widely used to reduce surgical steps and improve patient compliance. The aim of this study is to perform a retrospective study on 2,273 PEIs to evaluate their survival rate. In the period between January 2008 and December 2013, 877 patients (498 females and 379 males) were operated at the BDD private Practice Clinic (Milan, Italy). The mean post-surgical follow-up was 30±17 months (max – min, 84 – 1). Two thousand two hundred and seventy-three PEIs (EDIERRE Implant System SpA, Genoa, Italy) were evaluated in the present study. All patients underwent the same surgical protocol and agreed to participate in a post-operative check-up program. SPSS program was used for statistical analysis. Survival rate (SVR) was 97.7% since only 53 fixtures were lost from a total of 2,273 implants. Cross-tabulation between failures and timing of loading demonstrated a statistically significant higher risk of failures in case of immediate loading ($p=0.013$). There were 26 failures out of 761 immediate loaded implants against 27 lost fixtures out of 1,485 delayed loaded implants. PEIs is a reliable procedure, however surgeons should carefully select those cases which can be immediately loaded.

Post-extractive implants (i.e. PEIs) are widely used to reduce surgical steps and improve patient compliance. The survival rate (SVR) of implants placed into fresh bone sockets after extraction is similar to implants inserted in healed sites (1, 2). In addition, to replace extracted teeth in the anterior maxilla (aesthetic region), post-extractive implantology is the treatment most requested by patients (3). After tooth extraction, the alveolar cortical bone is resorbed (4, 5), and the gingival mucosa undergoes recession with detrimental effects on the aesthetics of smile. Thus, in anterior teeth, the remodelling of gingival mucosa negatively affects prosthetic rehabilitation. The reduction of the amount of bone edge, changes of gingival contour and loss of inter-dental dental

papilla with the consequence of appearance of black spaces in smile, are typical after tooth extraction in aesthetic sites. Atraumatic extractions (6), implant installation in the alveoli of the extracted tooth (7) and immediate provisionalization (8) have been proposed as alternatives to maintain the volume and contour tissue, decrease costs and length of treatment. Even if surgery without flap elevation could minimize resorption of the alveolar cortical bone supporting the marginal gingiva, dentists must explain to patients that aesthetic results are not as predictable. A recent review of Esposito et al. (9) reported that the aesthetic outcome might be better if implants are placed immediately after tooth extraction. In fact, the greatest advantage of post-extractive implant insertion consists

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in the preservation of alveolar cortical and the existing papillae (10). Preservation of bone margins during extraction, establishment of the primary stability of the implant in the apical portion of the socket, careful control of the flap tissue, adaptation and polishing of the provisional in the implant and peri-implant tissues, are key factors for the longevity of the treatment and clinical results (11).

Since implant dentistry has become a widely used procedure for rehabilitation of edentulous patients, we decided to perform a retrospective study on 2,273 fixtures (EDIERRE Implant System SpA, Genova, Italy) to verify their effectiveness in post-extractive socket rehabilitation.

MATERIALS AND METHODS

Patients

In the period between January 2008 and December 2013, 877 patients (498 females and 379 males) were operated at the BDD private Practice Clinic (Milan, Italy). The mean post-surgical follow-up was 30 ± 17 months (max – min, 84 – 1). Two thousand two hundred and seventy-three fixtures were included in the present study. All patients underwent the same surgical protocol and agreed to participate in a post-operative check-up program.

Subjects were screened according to the following inclusion criteria: controlled oral hygiene, absence of any lesions in the oral cavity, sufficient residual bone volume in order to receive implants of at least 3.3 mm in diameter and 9 mm in length.

The exclusion criteria were as follows: insufficient bone volume, a high degree of bruxism, smoking more than 20 cigarettes/day and excessive consumption of alcohol, localized radiation therapy of the oral cavity, antitumor chemotherapy, liver, blood and kidney diseases, immunosuppression, corticosteroid treatment, pregnancy, inflammatory and autoimmune diseases of the oral cavity, poor oral hygiene.

Data collection

Before surgery, radiographic examinations were carried out with the use of an orthopantomograph and CT scan.

The implant survival rate (SVR) was evaluated according to the following criteria: (i) absence of persisting pain or dysesthesia; (ii) absence of peri-implant infection with suppuration; (iii) absence of mobility; and (iv) absence of persisting peri-implant bone resorption greater than 1.5 mm during the first year of loading and 0.2 mm/years during the following years.

Surgical protocol

All patients followed the same surgical protocol. Anaesthesia of the jaw was obtained by the injection of articaine and post-surgical analgesic treatment was performed with 100 mg of ketoprofene 3 times a day, if necessary. An antimicrobial prophylaxis was administered with 500 mg Amoxicillin twice daily for 5 days starting 1 hour before surgery. Three surgeons (U.D.D., W.B. and G.C.) inserted all implants. Patients agree to follow a strict oral hygiene protocol and recall (Fig. 1 to Fig. 3).

Implants

A total of 2,273 fixtures were inserted: 1091 (48%) in the mandible and 1182 (52%) in the maxilla. There were 107, 1103, 664, 287 and 112 implants with 3.3, 3.75, 4.2, 4.5 and 5 mm wide, respectively. There were 108, 615, 820 and 730 implants 9, 11, 13 and 15 mm long, respectively. Seven hundred and sixty-one were immediate loaded whereas 571, 679, 249 and 13 were loaded after 3, 4, 6, 8 months, respectively. Implants were inserted to replace 359 incisor (15.8%), 217 cuspids (9.5%), 889 premolars (39.1%) and 808 molars (35.5%). Two thousand and thirty fixtures were inserted with 35 N torques whereas the remaining 243 with a lower torque.

Statistical analysis

The SPSS statistical program was used. Cross tabulation between variables and failures was performed and Pearson *Chi-square* test was used to detect those variables potentially associated with lost implants.

RESULTS

Survival rate (SVR) was 97.7% since only 53 fixtures were lost from a total of 2,273 implants. Cross-tabulation between failures and timing of loading demonstrated a statistically significant higher risk of failure in cases of immediate loading ($p = 0.013$). There were 26 failures out of 761 immediate loaded implants against 27 lost fixtures out of 1,485 delayed loaded implants. Peri-implantitis, due to bacterial infections, was the main cause of implant failures (12, 13). It is well known that bacteria of peri-implantitis are the same of periodontitis (14, 15), and genetic risk factors are also similar (15). In addition, our results report that immediate loading in respect to delayed loading is another factor influencing SVR (16).

DISCUSSION

All implants need a “biological width”. Biological



Fig. 1. *Pre-surgical radiograph.*

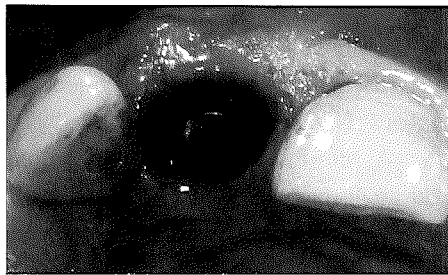


Fig. 2. *Post-extractive implant placement.*

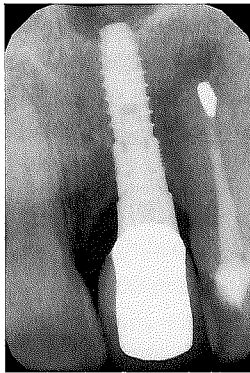


Fig. 3. *X-ray after 1 year.*

width is necessary to ensure implant stability and the correct position of marginal gingival mucosa. If these criteria are not respected, bone resorption around implant occurs until the biological width is reached (17). The insertion of post-extractive implants favours maintenance of biological width avoiding immediate bone resorption. The presence of alveolar cortical

bone allows a better gum line providing a greater soft tissue preservation in the final outcome of prosthetic rehabilitation. Finally, post-extraction implant insertion presents many advantages: decreasing time of treatment, immediate loading of implant and immediate prosthetic restoration (18). Atraumatic extraction with preservation of cortical bone can influence primary stability and SVR. There are additional benefits in using post-extraction technique: no post-operative complications, good oral home care, immediate restoration and recovery of social life. Some reports suggest that mucosa remodelling is unpredictable and other factors rather than surgical technique and bone resorption may influence this fact (19, 20).

In addition, flapless techniques and bone grafts improve preservation of biological width and aesthetic outcomes. The post-extraction implant also allows the maintenance of biological distance of 5 mm from the bone crest to contact point for obtaining papillae that fill the inter-proximal space. The platform of the implant should be placed at a minimum of 3 mm apical to the cement-enamel line of the adjacent tooth. These measures ensure an appropriate emergence profile and facilitate acquisition of interproximal spaces adequate for good oral hygiene (21).

Another important aspect of post-extraction implantology is in the correct preparation and placement of the temporary prosthesis. The immediate prosthesis allowing immediate loading is one of the fundamental factors for maintaining length and width of bone crest. Thus, it is mandatory to perform a careful selection of cases in order to obtain successful treatment of tooth extraction, immediate installation and provisionalization.

Our results demonstrate that PEIs have a high SVR (i.e. 97.7%) but caution should be taken in case of immediate loading since it has a slightly but significantly worse outcome than delayed loading. In conclusion, our results give additional strength to the fact that PEI is a safe surgical procedure and that devices from EDIERRE Implant System SpA, Genova, Italy are reliable for oral rehabilitation.

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