Immediate Loading of Post-Extraction Implant in the Aesthetic Area: A Case Report

G. Montaruli1,*, M. Iorio2, M. Laurenziello1, L. Lo Russo1, L. Laino3, D. Ciavarella1 and L. Lo Muzio1

1Department of Clinical and Experimental Medicine, School of Dentistry, University of Foggia, Foggia, Italy; 2Private Practice, Castelletto Sopra Ticino, Novara, Italy and 3Multidisciplinary Department of Surgical and Dental Specialties, Dental School, University of Campania Luigi Vanvitelli, Napoli, Italy

Abstract: Purpose: To illustrate the an immediate implant placement in an extraction socket with a pre-existing active inflammation due to tooth fracture, using evidence based surgical procedures.

Materials and Methods: After radiographic evaluation, a tapered 13 mm long implant (4.1 in diameter) was inserted after the extraction of a fractured tooth upper right lateral incisor in a 74 years old woman. The insertion of the implant followed a different axis than the tooth and a palatal position with a high primary stability. After the complete removal of the inflammatory lesion and insertion of the implant, a regeneration with biomaterial and a collagen membrane was performed. The fixture was loaded in 48 hours with a curved emergency profile abutment and a lithium disilicate crown.

Results: No complications were observed during healing; the patient experienced no pain and no impact on his own social relationships due to the reduced treatment duration.

Six months after loading the conditions of hard and soft tissue showed a high degree of stability. The crown was very well integrated with nice contour of peri-implant soft tissues.

Conclusion: Hence on the basis of stimulated and an accelerated bone growth in conjunction with soft tissue regeneration and a significant reduction in peri-implant pain and inflammation this case report demonstrates that careful surgical-prosthetic planning allows a definitive rehabilitation of an aesthetic area in an assured, rapid and predictable way.

Keywords: Tooth extraction, Bone regeneration, Lithium disilicate.

1. INTRODUCTION

A new paradigm shift in routine clinical practice is the influx of young and aesthetically aware patients seeking rapid treatment for aesthetic concerns. The dental treatment of aesthetic areas requires considerable proficiency in the technical skills of the clinician, a liaison between the operatory and the dental laboratory, durable and biocompatible dental materials, efficient equipment and patient compliance.

It was almost two decades ago when the encouraging results of the first immediate placement of implants in post extraction sites appeared. Over the years progress in this arena with respect to preoperative planning, the use of appropriate surgical techniques, optimum postoperative management of the surgical site has been able to achieve a high success rate and survival rates of this prosthesis with more predictable results [1,2]. Immediate non-functional load of a single post-extractive implant in the anterior maxillary region is a relatively predictable treatment [3,4]. Although this region is at a marginally higher risk of implant failure, aesthetic results obtained may be comparatively better [5] than those obtained with a delayed implant loading.

The presence of a periapical lesion at the site of extraction is not an absolute contraindication to the insertion of a post-extractive implant [6] unless insertion into a correct prosthetic position with adequate primary stability is precluded. Furthermore, a detailed load assessment in protrusive and lateral movements minimizes complications and failures of this prosthesis [7].

The immediate prosthesis, as well as the immediate placement of an abutment (no longer removed, the "one abutment, one time" concept) [8] appears to be beneficial for the maintenance of the interproximal and peri-implant bones [9] as well for the quality and stability of peri-implant soft tissues, with an adequate aesthetic outcome, although the skill and experience of both the surgeon and prosthodontist may affect such results.

This case illustrates a single piece immediate implant placement of an area with a preexisting periapical and a peri-radicular inflammatory lesion with a meticulous surgical and prosthetic planning leading to a predictable procedure with success in the maxilla.
2. MATERIALS AND METHODS

A 74-year-old female patient presented to our dental office in March 2017 with the complaint of a persistent swelling in the site of the upper lateral incisor. Her medication included Coumadin, Congescor, Lanoxin, and Dibase due to her cardiac disease and osteoporosis. There was no history of bisphosphonates intake. Her clinical examination revealed a secondary dentition, grade two mobility and soreness with mesiopalatal probing depth of 7 mm in the upper lateral incisor. The provisional diagnosis indicated a root fracture. A fistula in the mid-third of the root of tooth 1.2 (Figure 1) was visualized on the orthopantomogram (Figure 2) and radiolucencies were observed at the coronal and apical aspect of the root (Figure 3). An antibiotic therapy with amoxicillin 1 g twice a day for six days was prescribed alongside an analgesic and a Cone Beam Computed Tomography (CBCT) advised.

The CBCT cross-section displayed an alveolar bone height reduction, thinning of the buccal plate, (Figure 4) and local D2 bone density in the affected area (according to Lekholm and Zarb). This data was confirmed by an intraoral assessment.

Subsequent to the investigations and discussion with the patient a treatment plan was proposed. It comprised of preventive advice, extraction of tooth 1.2 under local anaesthesia with simultaneous placement of a titanium implant and immediate loading along with postoperative care.

The patient attended for her implant surgery (Figure 5a / 5b) in May 2017. As advised by the cardiologist, Coumadin® was alternated by a subcutaneous injection of Clexane® 4000 U.I. three days prior to the surgery until 3 days after the procedure. The upper right lateral incisor was extracted carefully with minimal trauma to the residual alveolar bone in the inflamed area. The socket was thoroughly mechanically debr-
ided and the gingival margin was de-epithelialized. The collapse of the vestibular aspect of the extraction site was immediately visualized (Figure 6) and the tooth fragmented into three parts (Figure 7).

Figure 5: Buccal and occlusal aspect of the surgical site.

Figure 6: The socket right after tooth extraction. The soft tissue undergoes an immediate collapse.

Figure 7: The extracted tooth is broken into three parts.

Figure 8: Buccal and occlusal aspect of the inserted implant.

A 4mm in diameter and 13mm in length BIOMET 3i™ NT413 implant was used; the three-dimensional position of the implant was continually verified during insertion (Figure 8a / 8b) and a final insertion torque of
40 Ncm was obtained and an immediate load performed (Figure 10). The implant position was indexed using a coping pick-up (Figures 12 and 13) splinted with self-curing resin to a position template prepared prior to the procedure (Figure 14).

**Figure 9:** IOPAR of the implant right after placement.

**Figure 10:** The torque indicating ratchet wrench shows 70 Ncm final insertion torque.

**Figure 11:** The implant is placed palatal with a different axis than the residual socket.

**Figure 12:** Impression coping in place.

**Figure 13:** IOPAR showing correct seating of the impression coping.

**Figure 14:** The coping is connected to the position template with self-curing resin.
The missing alveolar wall was reconstructed by inserting a resorbable collagen membrane and bone substitute in granules (Figure 15) to achieve the bony convexity (Figure 16).

Two days after the surgery, a Curvomax™ straight titanium abutment (CV412) was delivered. This abutment had a concave emergence profile which allowed peri-implant mucosa to proliferate, become thick and counteract the phenomenon of recession. This abutment was slightly smaller than the diameter of the implant platform and incorporates the platform-switching concept. The final coronal restoration made from pressed lithium disilicate ceramic was luted on the abutment directly (Figures 19 and 20).
The lithium disilicate glass ceramic crown was luted with temporary cement.

Figure 19: The lithium disilicate glass ceramic crown was luted with temporary cement.

Figure 20: IOPAR at crown placement allows for excess cement detection.

The patient was instructed and encouraged to follow oral hygiene advice, home and professional hygiene maintenance protocol with both antiseptic medications (hydrogen peroxide and chlorhexidine digluconate) and physiological solution [10].

Follow up on the fourth day after surgery and second day from the crown allowed evaluation of the initial integration of the crown with peri-implant mucosal tissues (Figure 21a / 21b). This integration of the bone was followed up on day seven (Figure 22a / 22b), at 1 month (Figure 23a / 23b) and at 3 months (Figure 24a / 24b). The surgical site showed adequate healing of the buccal aspect of the alveolar bone. The patient has since then enrolled for a professional hygiene program with recall visits every three months.

Figure 21: Buccal and occlusal aspect of the restored area four days after surgery.

Figure 22: Buccal and occlusal aspect of the restored area seven days after surgery.
3. RESULTS AND CONCLUSIONS

Even with the limitations of a single case report, the proposed case shows that adequate case selection, investigation and treatment planning, together with the implementation of surgical procedures and placement of prosthesis may be instrumental in achieving adequate outcomes in anatomical, biological and aesthetic variations.

From the clinical point of view, it is possible to verify the absence of any inflammatory sign in the peri-implant soft tissue, which exhibit a considerable degree of maturation (Figure 24a / 24b).

The duration of follow-up was 3 months; thus, for more robust evidence the evaluation over a more extended span of time is mandatory and need to be considered in comparison of outcomes in similar cases.

The current literature does not show any statistically significant differences in implant failures, complications and patient satisfaction between single implants placed immediately, at 6 weeks or 4 months after dental extraction; nevertheless, failures are slightly more frequent at immediate and immediate-delayed implants [11].

Bone changes are similar in all instances of temporal follow up however, better aesthetic results may be obtained in cases of immediate or immediate-delayed placement of the implants at 6 weeks.

Moreover, the results from immediate post-extractive implant placement with immediate prosthetic rehabilitation, often associated with minimally invasive surgery, are particularly promising in the aesthetic region [12] provided that an adequate patient selection is performed. The outcome and quality of the treatment is supplemented by the immediate functional load [13].

Hence a multitude of factors including accurate case selection, the use of implant systems with advances in design and technology, proper surgical technique, preservation of peri-implant tissues, quality standards
of the prosthesis and its components, precision in crown fabrication, and post-operative care may help in ensuring adequate aesthetic and functional results in cases similar to the one proposed [13].

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REFERENCES


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