

Immediate post-extractive implant with immediate provisional on right upper central incisor

Marco Redemagni, MD, DDS*

*Private Practitioner: V. Trento 23 - 22074 Lomazzo (Como), e Milano.

Abstract

The dilemmas that accompany immediate post-extractive implants often involve the decision of whether or not it would be better to maintain or not with additional surgery or maneuvers the anatomy of the root graft. The article presents a case of an immediate post-extractive implant with immediate provisional in the right upper central incisor together with regenerative procedures to bridge the gap between the implant and the surrounding bone and with management of the soft tissue quality by means of a dermal matrix. The therapeutic choice adopted allows an ideal management of the original anatomy, as opposed to the typical bony contraction and consequent loss of the vestibular bone plateau resulting from extraction of the tooth. It would be interesting to investigate whether this procedure is necessary only for aesthetic reasons or whether it can facilitate daily maintenance, improving the durability of the implant and prosthetic rehabilitation.

Introduction

For many years, the placement of immediate post-extractive implants has been recognized and accepted by the scientific community as a routine procedure, safe and predictable, logically, whenever it is possible to achieve adequate primary stability of the newly inserted implant^{1,2}. According to the classic Branemark's protocol of implant placement, the placement of an implant after the extraction of a tooth element needs a waiting period of 3-6 months, referred as healing process, before being able to perform surgery, followed by another 3-6 months of osseointegration time of the implant³, thus increasing the treatment time for both clinicians and patients. Thanks to current knowledge and experience, and the new technologies applied to the manufacture of implants, it is now possible to obtain new products with macro- and microstructures features that allow an immediate insertion of the implant in the post-extractive socket with a survival rate 95% to 100% and with a success rate ranging from 89% to 98% between 5 and 10 years⁴. Post-extractive implants also, can have multiple advantages including shorter treatment time, because healing of the socket and osseointegration of the implant occur simultaneously, a less psychophysical stress for the patient, an ideal prosthetic insertion of the

implant due to the preservation of the anatomical site that allows proper insertion of the fixture and most importantly, when combined with the use of a biomaterial and a tissue graft connective tissue, the maintenance of at least partial retention of the buccal bone plate, which usually resorbs following extraction, which is necessary for the achievement of an ideal esthetic result and for the maintenance of the draft vestibular, an indispensable factor for a natural appearance of the implant-prosthetic restorations (RBP: Root Bump Preservation)⁵⁻⁷. Particular attention, in fact, must be placed on the healing process of the extraction socket, which plays an important role for both the aesthetics and for the function of the implant. Several studies have shown that after a tooth extraction there is usually a contraction of about 50% of the original buccal bone plateau. Moreover, the most important remodeling occurs in the first 3 months after tooth loss, with greater contraction in the molar area than to other sites in the oral cavity, that, if not controlled and intercepted in time, could create an anatomic vestibular defect where, once the definitive crown, food will become trapped leading to a problem of hygiene maintenance with an increased risk of inflammation of the peri-implant tissues. In addition, it would a subtractive image would be created with a dark shadow around the emergence profile of the crown, which in the presence of a smile line wide could be visible and unappealing even in less aesthetic⁸⁻¹⁰. The placement of an implant in a post-extractive socket in combination with regenerative procedures (use of a bone substitute to bridge the gap between alveolar bone and implant), can help modify the process of spontaneous healing of the alveolus, reducing the size of the cavity that needs to be filled by new bone, consequently decreasing the contraction of the tissues around the implant and preserving as much as possible the natural root prominence⁸. Especially in the aesthetic areas and in the molar area, clinicians have to deal with the stability of the implant in fresh extraction sites¹¹, which is the key of this technique. In addition, there are other elements that can increase the difficulty of the procedure such as the presence of particularly inclined bone walls that make it difficult to keep the first bur in the correct position.

Another issue can come from the interradicular bone compromised

by periodontal disease or by iatrogenic extraction techniques, the problematic position of the maxillary sinus and inferior alveolar nerve, or implant placement in a particular root alveolus, especially in pluriradicular elements, which can cause incorrect profile of crown emergence or problems cantilevering with the final restoration^{12,13}. In this paper, a clinical case to show the efficacy and simplicity of this method to achieve a good esthetic result along with a functional maintenance of the anatomy of the root bump (RBP - Root Bump Preservation), which is necessary to avoid entrapment of food and to avoid the subtractive image of dark shadow responsible of the aesthetic damage.

Case report

A patient aged 34 years old came to our observation complaining of mobility and the yellowish color of the right upper central incisor. Indeed, on radiographic examination, it was evident also a pronounced resorption of the root, and it was thus decided to schedule an immediate post-extractive implantation with concomitant placement of the provisional crown and management of the gap between the bone walls and the implant with biomaterial and the soft tissues by means

Surgical Procedures

Prior to the surgery, the patient underwent a professional prophylaxis. The patient was premedicated 1 h before of surgery with 1 g of penicillin and clavulanic acid (Augmentin 1 g, GlaxoSmithKline, Verona, Italy) to continue with 2 g/day for 6 days. The first step involved extraction of the incisor by the use of a syndesmote and then by means of a forceps, taking care to preserve as much as possible the anatomical site and not to break the alveolar walls. After extraction, the alveolar bone was explored with a periodontal probe, to assess its integrity and to determine which diameter of implant to use. The implant was inserted 3 mm apically at the gingival margin free (Nobel Active, Nobel Biocare), in the center of the socket, slightly positioned toward the lingual side with correct three-dimensional positioning¹⁴. It seems logical to insert an implant of sufficient length and diameter for optimal anchorage. Immediately after relining a temporary crown, the space between the implant and the bone walls was filled with equine bone substitute (Calcitos, Bioactiva, Ita) to prevent possible resorption resulting in aesthetic damage. The biomaterial was inserted up to the level of the free gingival margin, to fill without

excessive pressure all the space between the crown, the implant and the alveolar bone⁵. Finally, given that the shape, thickness and the proportion of keratinized gingiva were ideal, the tissues were tunneled elevated through the parabola without any release incision and a dermal matrix was inserted (Cresos Mucogain, Nobel Biocare, Swiss) to improve and maintain the tone of the tissues themselves instead of a more classic autologous tissue graft connective tissue (Fig. 3).

Prosthesis procedures

Initially, the margin of the temporary resin crown was colored with a red pencil to facilitate its identification, then the provisional crown was relined with acrylic resin (Yates & Bird / Motloid) on a provisional titanium abutment. After polymerization of the resin, the crown was unscrewed and resin added to fill the space between the crown and the abutment.

The temporary was then finished by giving it a concave shape in its transmucosa, with the beginning of the concavity at the red line previously drawn.

The temporary crown was screwed down by hand, maintaining its stability with two fingers so as to

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Fig.1 - The right central incisor appears darker in color showing a certain mobility.



Fig.2 - On RX there is evidence of severe resorption of the root.

of a membrane dermal matrix (Figs. 1, 2).

Pre-surgical procedures

Considering that the profile of the soft tissue was ideal, it was decided to have a provisional prepared for the day of surgery that would repeat exactly the emergence profile of the element to be extracted, so as to properly support the soft tissues without introducing any change in shape during the healing phases.



Fig.3 - As soon as the implant was inserted, the gap between the implant and alveolar bone was filled with biomaterial, and between the soft tissue and the buccal bone plate a dermal matrix was inserted.

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transmit the least force as possible to the implant. Finally, the screw access hole was filled with teflon and covered with filler material (Telio inlay, Ivoclar, Italy). The occlusion was, then, checked and contacts were removed in both static and dynamic occlusion (Fig. 4). The patient was asked to avoid chewing on the treated area for 3 months and to avoid brushing her teeth for the first 2 weeks. She was prescribed a rinse with chlorhexidine at 0.12% (Ebuross, Dentsply) for 2 weeks. Thereafter, they were allowed conventional tooth brushing and interdental flossing. The patient maintained the temporary crown for 12 months, then an impression was taken, according to the method of Hinds¹⁶ (Fig. 5). It was, then, fabricated and screwed on the implant a zirconia ceramic crown with individualized abutment (Figs. 6, 7).

Discussion

Currently, a restoration supported by implant should meet precise aesthetic and functional requirements, especially when replacing a single element. The achievement of stable results depends largely on many factors, such as the amount of keratinized mucosa, the thickness and the height of the buccal and interproximal bone, the appropriate surgery, the correct insertion of the implant into the 3 dimensions of the space and the shape and material of the prosthetic components of the implant in its transmucosal^{14, 17, 18}. The objective of this case report was to be able to extract the element tooth while preserving the buccal and interproximal bone and, consequently, the papillae and soft tissues. A second goal was the use of a temporary resin crown following the exact anatomy of the tooth at the edge of the sulcus, and thus giving the possibility of having a correct individual position from which to start with the concavity. This temporary crown is able to support the marginal gingiva by providing a platform to promote the healing of the peri-implant soft tissues and protect the extractive socket during healing. In addition, in the literature it has been shown that epithelium and connective tissue can adhere to a clean surface of artificials and acrylic teeth^{15, 19-21}. The technique of immediate loading has an unquestionable advantage because the interpapillary fiber and gingival-alveolar teeth preserve the interproximal bone peaks when the peri-implant interdental tissues are provided with immediate support by a healing screw or by an immediate temporary²². In addition, the transmucosal portion of the provisional restoration was made concave because with this design any compression is avoided, and the tissue stability is better preserved and maintained over time. The soft tissues appear healthy, light pink in color and sometimes with a characteristic orange peel appearance similar to those around natural



Fig. 4 - The newly screwed provisional crown at the end of surgery



Fig. 5 - The peri-implant tissues one year after surgery appear very good both in shape and in tone and health status. The papillae are competent and the parabol is symmetrical to that of the adjacent. The root bump is very well preserved (Root Bump Preservation RBP).

teeth. A concave abutment, in fact, leaves more space for the connective tissue around the abutment, creating a kind of O-ring that acts as a barrier for the interface bone-implant^{18, 23, 24}. The filling of the space between the implant and the bone, up to the free gingival margin, with some biomaterial associated with a temporary crown whose concavity starts exactly at the level of the free gingival margin from which the crown should emerge helps to maintain as much as possible the previous anatomy, making possible the maintenance of the draft root in a manner almost identical to that of the adjacent dental elements. In addition, the use of a screw-retained restoration preserves the risk of leaving residual cement within the sulcus, with all the potential risks that could occur²⁵⁻²⁷.

Conclusions

Aesthetic and functional rehabilitation often involves an unconventional approach. A correct diagnosis of the anatomy and aesthetics, a plan of appropriate treatment and careful selection of materials are critical factors for the success of the restoration. The ability to preserve an anatomy already ideal is certainly an important starting point for the correct solution of the case along with the ability to manage both the surgical and the shape of the prosthetic restorations in such a way to maintain over time a result both functional and aesthetically satisfactory. The use of a screw-retained restoration with the transmucosal part capable to faithfully replicate the transmucosal created by the correct contour of the temporary is a prerequisite for optimal results. In addition, a screw-retained restoration allows to avoid cementing a crown definitive on a final abutment, circumventing the problem of removing of cement, in view of the fact that such excess has been associated with signs of peri-implant disease in the majority (81%) of cases²⁷. A team approach that includes the clinicians, the laboratory technician and the patient is equally essential to achieving the desired outcome.

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Bibliography available from the publisher



Fig. 6 - Definitive ceramic zirconia crown screwed onto the implant. The emergence profile is absolutely similar to that of the adjacent element.

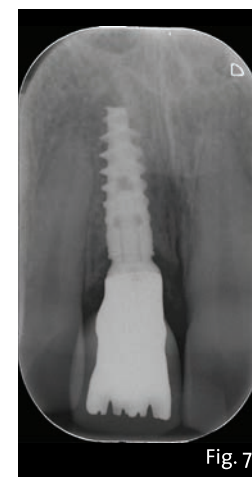


Fig. 7 - Final RX