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Case Report

Post-extraction immediate implant placement in the maxillary anterior region: A case report

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Abstract

Trauma of maxillary teeth in the anterior area is a common accident. In most cases, the result is a root or crown fracture requiring tooth extraction and implant placement. This case reports the replacement of two incisive due to a severe trauma by using immediate post-extraction implant placement. The harmony of soft and hard tissue was achieved by immediate implant placement with bone augmentation in esthetically challenging situation.

Keywords: Anterior, atraumatic extraction, fresh extraction sockets, immediate placement, implant

INTRODUCTION

The introduction of osseointegration by Branemark and coworkers (Branemark et al., 1969; Adell et al., 1981) and replacement of lost teeth by implants have revolutionized oral rehabilitation while significantly advancing restorative dentistry. Osseointegration was defined as the direct structural and functional connection between living bone and the surface of an implant (Albrektsson et al., 1981). Immediate implant placement, defined as the placement of dental implant immediately into fresh extraction socket site after tooth extraction, has been considered a predictable and acceptable procedure (Schwart et al., 2000). With immediate implant placement there is minimal use of surgical drills because the socket is already found (Barzilay et al., 1991). In 1991 indications and contraindications for immediate dental implants placement into the fresh extraction sites were described by Block and Kent. Indications include; 1) traumatic loss of teeth with a small amount of bone loss; 2) tooth lost because of gross decay without purulent exudates or cellulites; 3) presence of severe periodontal bone loss without purulent exudates; 4) inability to complete endodontic therapy; 5) adequate soft tissue health to obtain primary wound closure. Contraindications, include; 1)adverse location of the mandibular neurovascular bundle, maxillary sinus and nasal cavity; 2) adjacent soft tissue cellulites and granulation tissue;3) lack of an adequate bone apical to the socket; 4) presence of purulent exudates at the time of extraction; 5) poor anatomical configuration of remaining bone (Block and Kent, 1991). The results of extraction showed: 40% to 60% alveolar bone loss in the first 2 to 3 years and a resorption rate of 0.5% to 1% every year for the rest of the patient's life (Pinho et al., 2006; Schropp et al., 2003). The immediate replacement of the lost root prevents the loss of alveolar bone in height and width (Schropp et al., 2003). Immediate placement frequently requires bone augmentation to eliminate the geometric discrepancy between the extraction sockets and implant design (Chen et al., 2004). The alveolar socket is generally filled with the dental implant, heterologous bone or autologous bone obtained during alveolus preparation; the graft is necessary to reduce the gap between the implant and the alveolar bone and to accelerate the new bone apposition process (Schwartz and Chaushu, 1997). Placement of a dental implant in the esthetic zone is a technique- sensitive procedure with little room for error. A subtle mistake in the positioning of the implant or the mishandling of soft or hard tissue can lead to esthetic failure and patient dissatisfaction (Belser et al., 2004; Buser et al., 2004; Belser et al., 2004). The advantages of immediate implant placement include a reduction in treatment time, a reduction of surgical procedures and a reduction of aesthetic rehabilitation time (Huys, 2001; Saadoun,

Figure 1. Pre-operative intra-oral situation.

Figure 2(a). Pre-operative panoramic radiography.

2002). In this case report a satisfied aesthetic outcome was achieved with immediate implant placement.

Case report

A 20 years old patient arrived in the Brianza Dental Surgery Clinic, Tirana, Albania, after having a traumatic accident with a fractured right incisive and complete avolusion of the left incisive. He was presented in the clinic 12 hours after the accident (Figure 1). The patient expressed his desire to have a rehabilitation that could offer a functional and aesthetic outcome. Clinical, radiographic panoramic and 3D imaging examination showed proper conditions of hard and soft tissue for immediate intervention (Figure 2a, b, c). Immediate implant placement restoration was suggested andthe patient gave his written informed consent. Before starting the surgical procedure the patient received 2 g of amoxicillin 1 hour before surgery and rinsed for 2 minutes with 0.12% chlorexidine digluconate solution to reduce the risk of infections. Local anesthetic was injected buccally and palatally (Articaina HCL 4% with ephinefrine 1:100000). First the sock of the avolusioned left incisive was irrigated with sterile saline and debrided carefully with a manual instrument. To achive a good primer stability we did an under preparation implant site. A 5.0* 13.0 mm implant was placed in the prepared socket with a torque of 50 Ncm (Figure 3). The implant was placed 1mm under the buccal margin bone, and the residual gap between the implant surface and the buccal margin bone wall was ≥2 mm. The implant was inserted 3 mm apical to the free gingival margin. Titanium abutment is screwed on the implant. To obtain a bone regeneration and bone integration in the circumferential area the residual gap was filled with bone graft**,** (collagen matrix Osteobiol by Tecnoss), and compressed with a manual instrument (Figure 4). The residual root of the fracturet right incisior

Figure 2(b). Pre-operative 3D imaging of the root fractured right incisive

Figure 2(c). Pre-operative 3D imaging of the alveolus of the avolusioned left incisive.

Figure 3. A 5.0* 13.0 mm Implant placement with a torque of 50 Ncm.

Figure 4. Bone graft augmentation.

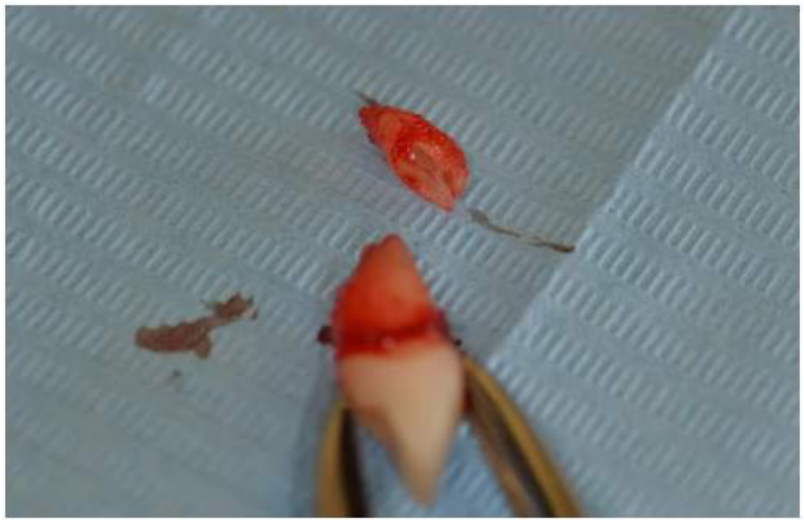

Figure 5. The fractured tooth and the residual root removed.

Figure 6. 5.0* 13.0 mm Implant placement with a torque of 50 Ncm.

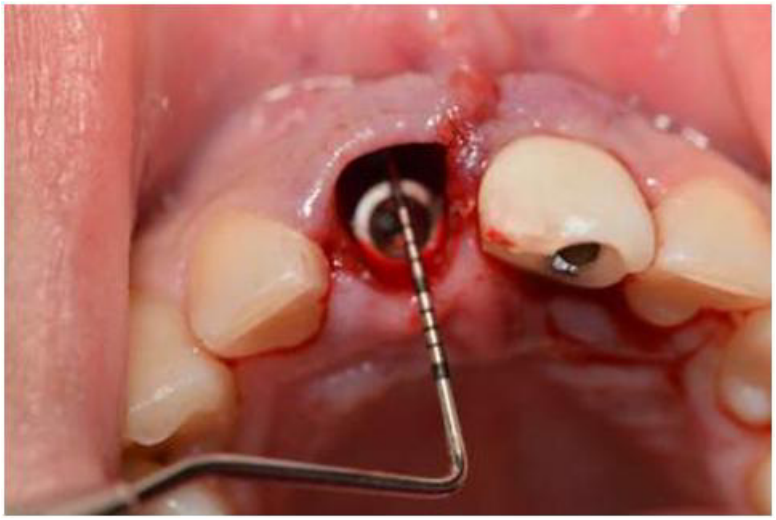

Figure 7. ≥2mm residual gap between the implant surface and the buccal bone.

Figure 8. Bone graft augmentation.

Figure 9. Post-implant placement panoramic radiography.

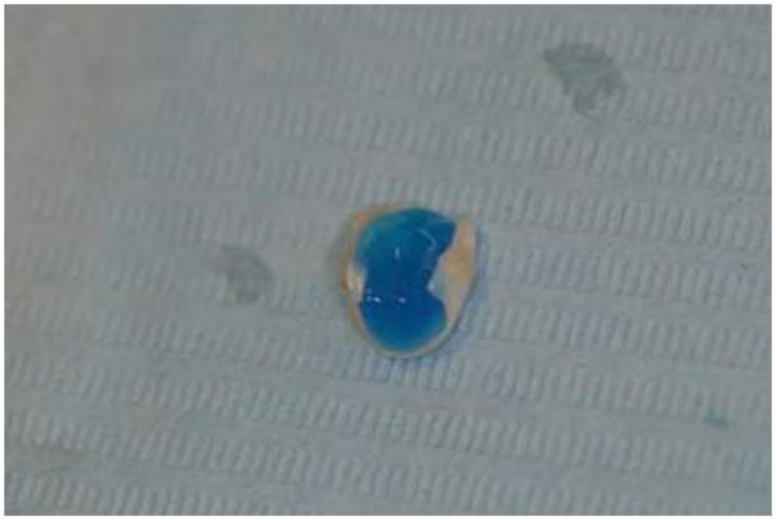

Figure 10. Part of the prepared crown of the avolusioned tooth, prepared with phosphoric acid gel.

Figure 11. Single structure of the crown united with the abutment.

Figure 12. Final provisional restoration.

Figure 13(a). Intra-oral situation. Symmetry of gingival margin after 3 months of healing.

Figure 13(b). Permanent prosthetic restoration in zircon-ceramic, after 3 months of healing showing a complete fill of the mesial interdental space between 2 central incisors.

Figure 14. Clinical situation after 12 months, the gingival margin levels and the interproximal papilla remained stable.

was extracted atraumatically to preserve the integrity of the interproximal papillae and remaining buccal and palatally bone plates. The root was carefully extracted using a luxator, avoiding of breaking the bony margins of the alveolus (Figure 5). The extraction socket was debrided using a manual instrument and was irrigated with sterile saline. Also in this case to achieve a good primer stability we did an under preparation implant site and a5.0* 13.0 mm implant was inserted with a torque of 50 Ncm (Figure 6). Again a ≥ 2 mm residual gap between the implant surface and the buccal bone wall was evidented (Figure 7). A titanium abutment is screwed in the implant. The residual gap was filled with bone graft, (collagen matrix Osteobiol by Tecnoss), and compressed with a manual instrument (Figure 8). The post-radiographic panoramic showed primer stability of the implant placement (Figure 9).

For a natural aesthetic outcome and to save time the crowns of the loss and the fractured tooth were cut and were used as provisional restoration (Figure 10). The crowns are prepared over the abutment, with 37% phosphoric acid gel for 20 seconds, rewashed and dried, after lubricating the surface with bond adhesive and polymerization we unite the crown with the abutment (Figure 11). The single structures were fixed filling the gap between the provisional crown and the abutment with flowable composite resin and were subsequently removed from the implants to eliminate the occlusal stops and refine and contour the surface profile so as to achieve proper adaptation of the gingival soft tissue. The occlusion was adjusted, the occlusal contacts in centric relation and in protrusive/ lateral movements were removed and in the end the screw access holes were filled with flowable composite resine.

The patient was placed on amoxicillyn 500 mg 3/day for 5 days, and was instructed to rinse twice daily with 0.2% chlorhexidine digluconate for 2 weeks. After the surgery the patient did not report any specific symptoms and did not show any adverse clinical signs, his desire for aesthetic and fuctional outcomes were achieved (Figure 12).

The patient came after 3 months and a definitive impression was taken for the permanent prosthetic restoration in zircon-ceramic. Symmetry of gingival margin was achieved (Figure 13a) with complete fill of the mesial interdental space between 2 central incisors (Figure 13b).

After 6, 8 and 12months the clinical and radiographic parameters were really optimal: the gingival margin levels and the interproximal papilla remained stable, over this period of time even the interproximal bone level also did not show any change (Figure 14). Another appointment was schedule after 24 months after surgery and no changes in the soft and hard tissue had occurred, patient's conditions were very good.

DISCUSSIONS

Several authors have shown that immediately loaded post-extraction implants have a survival rate of 94.5-100% after twelve months of follow-up (Lang et al., 2007; Colomina, 2001; Vanden et al., 2005; Cornellini et al., 2005; Schwartz-Arad et al., 2007). Correct clinical, prosthetic and surgical management of endosseous implants replacing missing teeth in the anterior maxilla enables the dental surgeon to achieve predictable aesthetic outcomes. The immediate placement in postextracion sites is a surgical option that ensures ideal perimplant tissue healing, while at the same time preserving the presurgical gingiva and bone (Sammartino et al., 2007; Somanathan et al., 2007). It is important to understand the patient's expectations and desires, paying particular attention to his or her psychological and socio-economic status, as well as to his or her oral condition (Matthias et al., 1993). Some patients seek rehabilitation capable of offering the best aesthetic outcome possible despite the cost, whereas others request rehabilitation capable of affording a satisfactory aesthetic result at a lower cost (Vallittu et al., 1996). This clinical case shows that an immediate implant restoration placed in a post-extraction site can constitute a safe and successful treatment procedure, it's a simplified technique, which makes it possible to reduce the number of implant components and materials involved, and consequently to reduce the cost of treatment, while maintaining acceptable aesthetic and functional outcomes. The provisionalisation makes it possible to condition implant soft tissues in order to preserve the interproximal papillae and restore a curved/rounded appearance of the gingival margin. It permits immediate healing of the soft tissue with the formation of an adequate mucosal seal (Kinsel and Capoferri, 2008). The immediate replacement of the missing root with a post-extraction implant avoids the loss of bone in height and width (Schropp et al., 2003). The extended treatment period during the healing phase may be inconvenient for some patients. The advantages of immediate implant placement include a reduction in treatment time and a reduction of surgical procedures (Huys, 2001; Saadoun, 2002). Immediate implant placement improved that may be a good treatment option in the loss of anterior teeth (Ataullah et al., 2008).

CONCLUSIONS

The advantages of immediate implant placement include a reduction in treatment time, a reduction of surgical procedures and a reduction of aesthetic rehabilitation time. In this case report the patient's desires in terms of aesthetic and functional rehabilitation were satisfied. The harmony of soft and hard tissue was achieved in an esthetically challenging situation using the technique of immediate implant placement following tooth extraction.

Conflict of Interests

The author confirms that this article content has no conflicts of interest.

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