

Rehabilitation of Endodontically Failed Anterior teeth by Immediate Replacement and Loading of an Implant supported Crown: A Case Report.

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Case Report

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ABSTRACT

There are several restorative alternatives for replacing a missing anterior tooth. The single implant-supported crown is among the best restorative options under certain biological and biomechanical condition like sufficient bone quantity, condition and morphology of the periodontium, integrity of natural and restored teeth. The long-term success of an implant supported crown depends upon the health and stability of the peri-implant hard and soft tissue. This case report we discuss the replacement of endodontically failed anterior teeth by extraction followed by immediate placement of implant along with bone graft and provisionalisation using zirconia abutment.

INTRODUCTION

Until a few years ago, the main focus of Implantology was on the simple restoration of the masticatory function. Today, the esthetic expectations of the patients exemplify a new challenge in modern Implantology. Restorations in the anterior esthetic zone present challenges in both the surgical and prosthetic stages of implant dentistry ^[1]. The 2-stage surgical protocol established by Branemark et al consisted of a healing phase of 3 months for the mandible and 6 months for the maxilla, to allow the formation of mineralized tissue at the interface of dental implants before functional restoration ^[2]. It was theorized that early or immediate loading would promote fibrous tissue formation around the implants rather than around the bone ^[3]. Because of improved surgical instrumentation, implant design, and surface topography, this concept has been changing now a days. Esthetics has been always an issue with regard to patient satisfaction, and use of ceramometal restorations in the esthetic zone is unpredictable. In some instances, the final outcome can prove disappointing to both the clinician and the patient.

All ceramic crowns may be the ideal choice to replace natural teeth in esthetic areas. The use of ceramics for both the abutment and crown would provide better translucency for the implant restoration than is obtainable with metal abutments and ceramometal crowns. Ceramic abutments would also be preferable to metal components because of the gray color that can be transmitted through the peri-implant tissues with metal components ^[4]. In 1994, the first esthetic ceramic abutment of dense aluminum oxide (Al₂O₃) was introduced (Cer-Adapt; Nobel Biocare). The problems presented by this abutment included its radiolucency and low fracture resistance ^[5,6].

Case Report

A 25 year male patient presented to the office with a chief complaint concerning the esthetics of the endodontically treated maxillary left central incisor. The objective was to use existing resources to have them blend better with his existing natural dentition. Pre-surgical evaluation was done using photographs, panoramic radiographs, and CBCT. (Figure 1) The patient was given a detailed explanation concerning the present state, alternative treatment plans and the proposed procedure which included immediate implant placement and temporization. The patient was very conscious about his aesthetic and was very keen for earliest possible restoration of his teeth and so he opted for proposed procedure.

Surgical Phase

Atraumatic tooth extraction is the first and one of the most critical steps of immediate implant placement. Preparation of the implant bed (osteotomy) with the recommended sequence of bone drills should start on the palatal aspect of the extraction socket when an anterior tooth is immediately replaced. It is a common error to start the osteotomy with the bur centered in the alveolus. For an ideal osteotomy, the drills should be placed along the palatal wall of the extraction socket to achieve a final implant location centered between the incisal edge and cingulum of the prospective tooth. The extraction socket was thoroughly debrided and after sequential drilling Ankylos C/ implant of 3.5 mm diameter and 11mm length was placed in the extraction socket of the central incisor with the insertion torque of 45 Ncm. A bone substitute material (eg, Bio-Oss, Osteo-health, Shirley, NY) was placed in the gaps between the implant and alveolar bone to avoid resorption. (Figure -2). Implant first thread was placed 1.5 mm apical to crestal bone of the socket and adequate primary stability was obtained. Post-operative periapical radiograph was taken. (Figure -3).

It was planned to connect a definitive prefabricated abutment to the implant immediately after surgery. In such cases, it is key to ensure proper orientation as well as the primary stability of the implant to facilitate correct orientation of the prefabricated abutment and provisional restoration. Because of non-indexed conical connection between implant and abutment of ANKYLOS® C/ Implant system, it's an advantage to the clinician to place the abutment in any desired location. In this case we used CERCON® Balance Anterior small 1.5mm G/H 15° angulated abutment. An impression was taken to fabricate a provisional crown using Protemp™ 4 (3M ESPE) temporization material.

Final Prosthesis

All relevant parameters were reevaluated 8 months after implant placement and provisionalization. Wound healing and soft tissue integration were ideal, and radiographic evaluation revealed positive bone remodeling. Implant level impression was taken using impression post and an all ceramic crown was fabricated and cemented using RelyX™ Unicem Self-Adhesive Universal Resin Cement - (3M). (Figure 5)

Figure 1: Pre-Operative IOPA



Figure 2: Bone substitute in situ

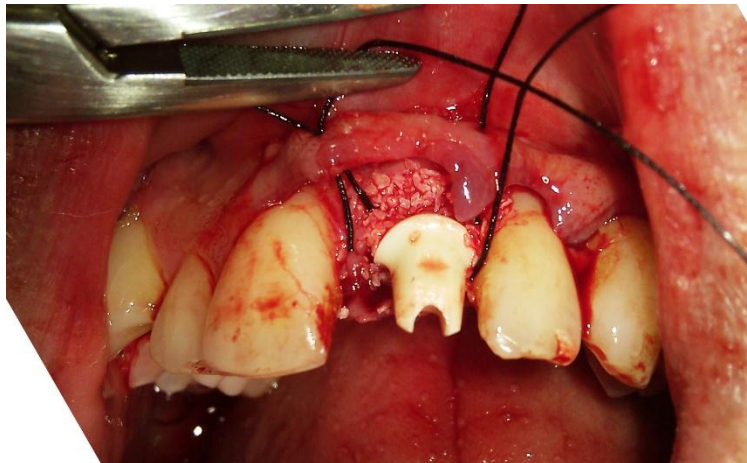


Figure 3: Post-Operative IOPA

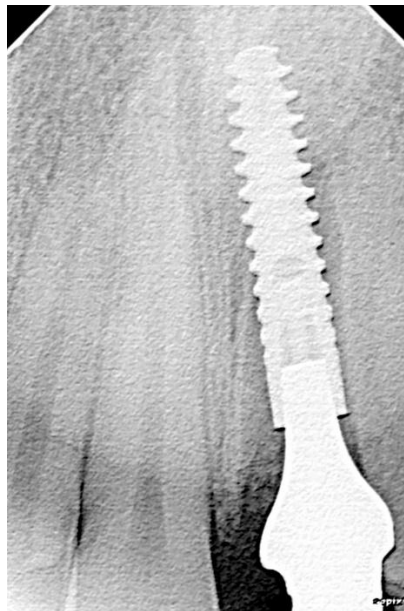


Figure 4: Picture showing Provisional Crown i.r.t 21



Figure 5: Final prosthesis Cemented i.r.t 21



DISCUSSION

In contrast to the natural tooth, at the implant site the alveolar mucosa adopts the function of the biological seal between the non-sterile oral cavity and the sensitive bone tissue. The tapered transmucosal collar of the ANKYLOS® system allows a maximum tissue volume and thus a stable peri-implant soft tissue. The adhesion of soft tissue (epithelial adhesion) to the polished surface which has been frequently described in literature is therefore mechanically stabilized [7].

Long-term studies with the ANKYLOS® implant system have started back in 1987 and prove that the special design of the endosseous implant leads to a significantly reduced bone resorption during prosthetic loading. Only in 2 % of the cases a change of the gingival margin was found which is because of the tapered connection between endosseous implant and abutment [8]. In this case report we have used CERCON® Balance, which are anatomically shaped zirconium oxide abutments with all the advantages and properties of a future-oriented material: extremely high load capacity, esthetics and biocompatibility.

Zirconium oxide is extremely fracture-resistant; therefore the new ceramic abutments also offer the advantages of the tapered connection between abutment and implant. Moreover, the translucent properties of the ceramic material lead to superior esthetics, not to mention the excellent biocompatibility which is guaranteed by only processing a material which is certified for medical application.

Immediate placement of dental implants to support replacements of single teeth, even in esthetic sites, is now very predictable [9,10]. Immediately placed implants have numerous advantages over delayed placement techniques, including maintenance of the existing gingival embrasure form and marginal contour, preservation of the existing bone, reduced surgical procedures, and shorter treatment times [11,12]. The long-term ability of the implant to retain a crown is Superior to that of a natural tooth, particularly one that is endodontically treated and supporting a post and core.

CONCLUSION

The decision by the clinician and patient to retain or remove teeth should be based on a thorough assessment of existing endodontically treated teeth. The clinician should consider several factors when determining whether to retain the tooth or extract it and place an implant. These factors depend on patient's health status, the condition of the tooth and periodontium, and treatment-related considerations. Immediate surgical and restorative protocols can facilitate better post-operative results provided strict guidelines for atraumatic intervention and preservation of existing anatomic structures are followed. The use of a zirconia abutment may be considered when an implant-supported single-tooth restoration is fabricated in an esthetic zone where the occlusal forces are slight to moderate. The ceramic post is especially advantageous when the mucogingival complex is thin and translucent.

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