Conventional implant with orthodontic treatment for anterior missing tooth management

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Abstract

Improved technology and interdisciplinary team work allows dental providers to achieve treatment goals of function, esthetics, stability and health. This paper reports the management of a missing single anterior tooth by conventional implant prosthesis along with adjunctive orthodontic treatment.

Key Words: Implant; Orthodontics; Anterior Teeth.

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Introduction

Implant-bone restoration has become a treatment modality accepted by scientific community for fully and partially edentulous patients. The breakthrough in oral rehabilitation was initiated by the discovery of titanium based dental implants capable of achieving anchorage in jaw bone with direct bone to implant contact. This functional ankylosis is often referred to as osseointegration. It was first described by Brånemark, Schroeder, and well documented by Davies.

The original Branemark protocol requires implant to be inserted 4-7 months prior to loading. This long treatment period may be of great inconvenience, and is sometimes the reason for not choosing implant supported restorations. This time-related limitation of implant restoration can be made advantageous should the partially edentulous patient require prior orthodontic correction for satisfactory prosthetic rehabilitation. This paper reports the management of a missing upper left central incisor of a young male patient which was replaced by conventional implant prosthesis with adjunctive orthodontic treatment.

Case Report

A 28-year-old male reported to the Dept. of Prosthodontics, CDSH, Rau, Indore, with missing upper left central incisor. Dental history revealed fracture and subsequent extraction of the said tooth 6 months back. Patient was partially edentulous since then. His medical history was normal. Intraroral examination showed that his oral cavity was in good condition apart from mesial drifting of upper right central incisor and left lateral incisor also lower anterior teeth were poorly aligned interfering with normal over jet relation with planned prosthetic replacement. Other hard and soft tissues were sound. (Figure 1a, 1b) As agreed by the patient, the treatment selected was conventional implant prosthesis with simultaneous orthodontic correction during healing phase for creating optimum esthetics and incisal guidance.

Implant surgery: Under aseptic precautions, left infraorbital and nasopalatine nerve blocks were administered. Two release incisions with crevicular incisions were placed and the surgical site was exposed. Initially drilling was done with round drill and subsequent graded drilling was done with 2mm, 2.8mm, and 3.2mm drills.

Figure 1a and 1b. Pre-operative view

A self-tapping Hi-tech implant of size 3.75 x 13 mm was placed at the prepared site using a surgical stent as a guide (Figure 2a). Implant was screwed into the bone and tightened with a wrench. Sutures were placed to close the surgical site. The patient was recalled after 48 hours for post-operative checkup. No complaints were reported by the patient and healing was uneventful. After 7 days, checkup was done and sutures were removed. After one month, implant site was opened and healing screw was removed and replaced by healing cap, which was kept for 15 days.

Figure 2a. Implant placed, 2b. temporary prosthesis

Provisional prosthesis: Non-loaded provisional prosthesis was planned which act as a guide for orthodontic correction during healing period. Impression along with impression post was made with elastomeric impression material. Lab analog was transferred to the master cast; straight abutment was adjusted and tried in patient’s mouth. Provisional restoration of heat cure acrylic resin was cemented with temporary cement over adjusted implant abutment in patient’s mouth (Figure 2b).

Healing Phase / Orthodontic Correction:

Sectional orthodontic treatment was planned for both upper and lower anterior teeth. Space
regaining for the lost upper left central incisor and alignment of lower anterior teeth was achieved. Ribbon arch brackets were bonded on upper right central and left lateral incisor along with rigid 0.016 Australian stainless steel wire section. An open coil spring was used to regain space lost for missing tooth. In the lower arch proximal stripping was done to gain space for alignment of anterior teeth. Ribbon arch brackets were bonded with a flexible 0.016 NiTi wire section (Figure 3a). Orthodontic treatment lasted for a period of three months after which final prosthesis was planned. Final Prosthesis: Space regaining and alignment of lower anteriors by orthodontic treatment created desired space for final prosthesis with scope for creating sufficient over jet (Figure 3b). Final prosthesis of appropriate shade in the form of Porcelain Fused to Metal crown was fabricated, tried and cemented (Figure 4a,4b). At the one-year recall the implant and the crown were in good condition. The patient was very pleased with the result.

Discussion

A common axiom in traditional prosthodontics for partial edentulism is to provide a fixed partial denture wherever possible. As a result of continued research in treatment planning, implant design, materials and technique, implant prosthesis often offer a more predictable treatment course than traditional restorations. One of the commonest procedures performed in conventional implant dentistry is single tooth replacement. The maxillary anterior single tooth implant often can come closer to ideal goals of implant dentistry than any other modality. Duration of conventional implant prosthodontic treatment may be of great inconvenience and limitation because as per surgical and prosthetic protocol suggested by Branemark and progressive bone loading concept by Carl Misch, time required for rigidly fixated implant to heal and to be restored is approximately 4-7 months depending upon bone density at initial surgery.

The partially edentulous case discussed in this article required orthodontic correction of tilted teeth adjacent to implant site and realignment of lower anterior teeth for creation of ideal pontic space and sufficient overjet respectively. This orthodontic correction could have been a prerequisite for most of the available prosthodontic treatment plans. In the said edentulous case, orthodontic correction was achieved by sectional orthodontic treatment utilizing the time made available during the healing phase of implant, thereby justifying the longer duration conventional implant prosthesis as the treatment of choice.

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