

Single Tooth Replacement with Cortico-Basal Implantology: A Case Report

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ABSTRACT

Background: Basal implantology is also termed as bi-cortical implantology, cortical implantology, and strategic implantology. Cortico-basal implantology is a modern, innovative implantology system that utilizes the basal cortical portion of the jaw bones for retention of the dental implants, which are less prone to resorption and are infection-free. In basal implants, all cases (single tooth/segment/full arches) can be loaded immediately within three days (immediate functional loading). This is not the case with conventional implants as they are loaded after 3-4 months of healing. All basal implants are placed flapless. In smooth surface basal implants, the problem of periimplantitis simply does not exist. Peri implants is an issue restricted to rough surface implants. Even for single tooth replacements, 2-3 implants are placed. This leads to ideal force distribution under immediate loading situations. The techniques of basal implant allow flapless immediate loading even in the most resorbed jaws without need of bone grafting surgeries. One single compact surgical kit is enough for all basal implants surgeries as opposed to conventional implants, which need multiple kits for various procedures.

Keywords: Basal implants, conventional implants, flapless, periimplantitis.

INTRODUCTION

The placement of dental implants is extensively practiced in implant dentistry. However, there are conditions when conventional implant placement is not possible. An adequate buccal and lingual or palatal bone must be present for successful osseointegration of conventional implant (at least 13-15 mm length and 5-7 mm width). There are procedures when implant placement must be combined with additional surgical treatments like bone grafting, direct or indirect sinus lift procedures. These procedures are extremely technique-sensitive and are rarely feasible. New treatment modalities like cortical or basal implants can overcome the shortcomings of conventional

implants¹. Dr. Jean-Marc Julliet was the first person to use single-piece implants in 1972. Dr. Gerard Scortecchi was the first person to develop a single-piece implant system termed as "Diskimplants." Later, Dr. Stefan Idhe pioneered the progress of basal osseointegrated implants (BOIs). Basal implants uses the basal bone as an anchorage, which is less prone to resorption and infection as compared to the cortical bone utilized for conventional implants engagement. In corticobasal implantology, osseointegration of basal implant in the first cortex is neither crucial nor necessary for the functioning of the bone-implant prosthetic system². When multiple teeth are missing or must

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be extracted after a two-stage implant placement procedure or bone augmentation has failed, or in cases of all types of bone atrophy, such as those involving very thin ridges, insufficient buccolingual thickness, or insufficient bone height, basal implants can be used. In addition, conventional implant placement may involve additional surgical procedure for augmentation, resulting in increased cost and duration of treatment³. Although basal implant-supported prosthesis has been well documented in the literature in patients with resorbed ridge and completely edentulous arch, there is scarcity of reviewed literature on the use of basal implants in maxillary and mandibular aesthetic region⁴. This case report describes a case of the rehabilitation of missing maxillary central incisor using basal implants with immediate loading and a two-year follow-up.

CASE REPORT

A 29-year-old male reported a chief complaint of missing maxillary right central incisor along with fracture and pain in maxillary left central incisor since one month. Patient presented with history of trauma to his face due to a train accident one month ago. Intra-oral examination revealed root fracture in relation to tooth no.11 and crown fracture and pain on percussion in relation to tooth no. 21. Intraoral Periapical radiograph revealed Ellis class V fracture i.e root fracture with maxillary right central incisor i.e 11 and Ellis class 3 fracture (crown fracture with enamel, dentin and pulp) with maxillary left central incisor i.e 21 (**Figure 1**).



Fig 1: Showing Preoperative Intraoral Periapical radiograph revealed Ellis class V fracture with 11.



Fig 2: Showing preoperative clinical view of 11.

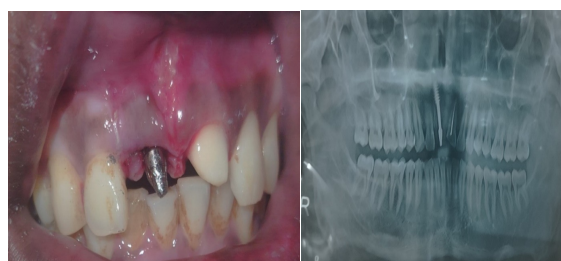


Fig 3: Showing Single Piece Implant Placed in 11 Region Clinically and Radiographically.

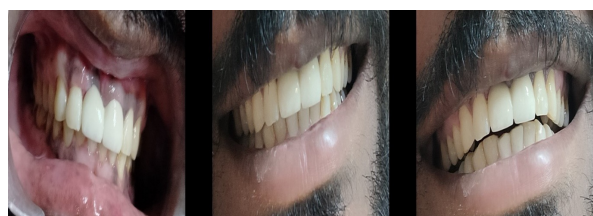


Fig 4: Post Treatment Follow up After Two Years.

Treatment Planning

Treatment options for maxillary right central incisor was discussed, which included extraction, rehabilitation using conventional implants with bone augmentation, tooth-supported fixed dental prosthesis, and basal implant-supported fixed prosthesis. It was decided with the patient's consent to proceed with implant-supported fixed dental prosthesis using axial basal polished surface implants with cortical anchorage. Bone sounding was performed to evaluate labial cortical plate. The selection of single-piece basal implants was also made by taking the patient's affordability into consideration.

Surgical Procedure

One gram of amoxicillin was administered 1 hour prior to surgery. Chlorhexidine rinses were done prior to the surgery. Local anaesthesia was administered using 2% lignocaine with 1:80,000 adrenaline via infiltration technique in the maxillary right central incisor i.e 11 region. No flaps were designed and no incisions were made. Tooth no 11 was carefully removed and the sockets were debrided and irrigated with Betadine. Figure 2 depicts a preoperative view of 11.

Now a single pilot osteotomy with a pathfinder drill 2.0 was performed from the socket of 11 with palatal approach towards the nasal floor. The nasal floor was hit and the length was measured. Throughout the surgery, saline irrigation was used externally. A single piece basal implant (Monoimplant, Switzerland) length 20mm & width 3.5mm was placed engaging the nasal cortex with 60 Ncm torque (**Figure 3**).

Simultaneously, root canal treatment with 21 was completed prior to implant placement. On The same day, abutment and tooth preparation were done, and an impression was made with alginate. Within 48 hours, joint crowns of porcelain fused metal PFM were cemented using type I luting glass ionomer cement. Post-insertion care instructions and a follow-up schedule were given to the patient. The patient was followed up for two years, and on clinical evaluation, the prosthesis was found to be satisfactory (**Figure 4**).

DISCUSSION

The various consensus reports on basal implantology have given satisfactory outcomes concerning its placement, immediate loading, and the concept of osseofixation. Since then, several studies have been done to accumulate data on its success and survival rates. Even though large-scale studies have not been done, reports of cases with a follow-up period of one to five years have significantly established increased survival rates. Garg et al. investigated the survival of endosseous (immediate loading) implants and basal implants. Fifty-two implants, 34 endosseous and 18 basal, showed satisfactory results. In present case report, there was no mobility after crown placement, and the prosthesis achieves proper functional needs ⁵.

Basal or cortical implants are available as single-piece implants. Thus, they remove micro gaps between the abutment and implant⁶. They gain bone anchorage with the apical blade-like threads attaining superior primary stability than conventional implants. Immediate/early placement of single-piece basal implants following extraction or avulsion of teeth in the anterior aesthetic zone allows immediate loading, thereby maintaining the patient's aesthetics using fixed temporary prosthesis. Satisfactorily stabilised single-piece implants can be successfully loaded out of occlusion at the time of implant placement and definitively loaded in occlusion three months later without affecting the function or aesthetics⁷. Prithviraj et al. suggested that most dental practitioners preferred immediately loading single-piece implants⁸. Lazarov et al. reported a cumulative survival rate of 97.5% after four years for basal implants, and they also concluded that the immediate functional loading concept with cortically anchored implants for completely edentulous arches, segments, and single-tooth replacement can be a successful treatment modality even in cases where extractions of teeth were done simultaneously⁹. Basal implants has been used for tooth replacement in the posterior region and aesthetic zone and demonstrated long-term successful results of up to 10 years, proving that preserving the crestal bone level and biological width for periodontal stability is possible¹⁰. A prerequisite for successful implant treatment is the achievement and maintenance of osseointegration, defined as a "direct contact between living bone and load-carrying endosseous implant"¹¹. The design of basal implants to achieve cortical bone anchorage shows their use in challenging clinical scenarios, including rehabilitation of atrophic ridges. Basal implants can play a crucial role in the rehabilitation of patients, where compromised quality and/or quantity of bones is present¹². Patients' satisfaction while shifting from traditional implant prosthesis to basal implant-supported prosthesis was assessed by Awadalkreem et al and reported an better patient satisfaction score¹³.

This case report presented a novel technique of using the basal or cortical implant to its best conceivable advantage. We believe that clinicians should act in accordance with patients' requests. Patient eagerly seeks early outcomes from implant

therapies. The philosophy of placement of basal implants differs from conventional implantology, which depends solely on osseofixation rather than mere osseointegration.

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