

Case Report

Rehabilitating Anterior Ridge Defect with Implant Supported Prosthesis Using Bone Graft and Customized Abutment - A Case Report

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ABSTRACT

Prior to the age of implants, tooth replacement for an edentulous person implied the use of a removable prosthesis. Modern implantology now offers hope for a fixed prosthesis with improved function. Reconstruction with dental implants has evolved considerably. Rather than merely focusing on the tooth to be replaced, today's implant practitioners considers a broad and complex set of interwoven factors before formulating an implant treatment plan. Implant dentistry is a fast developing field which has a wide area of application. Though an expensive affair it is the treatment which most patients opt for. To assure a definitive treatment plan with no loopholes, thoroughly patient examination & evaluation of all the related factors is essential.

Key words: implant supported dental prosthesis, endosseous dental implants, angulated abutments, UCLA abutments.

INTRODUCTION

Rehabilitation in the anterior maxilla with implant poses a challenge to the clinician. [1] Esthetically implant should be placed with regard to the buccopalatal direction to enable a suitable emergence profile of the prosthesis. [2] The ideal emergence profile is where the crown of the tooth emerges from the gingiva as in the natural situation. This makes the prosthesis appear more natural and promotes oral hygiene procedures. Loss of teeth in the anterior maxilla leads to resorption of alveolar bone from the labial aspect, leaving a palatally positioned alveolar ridge. Implant positioning and final esthetic result will be compromised in such situation. Teeth in the anterior maxilla are also vulnerable to traumatic loss and also concomitant bone loss resulting from the trauma or from surgical removal of roots. If

implants are not placed immediately after extraction, patients may be left with poor bone support for the soft tissues and implants, [3] Bone osteoplasty, additional surgical or prosthetic steps and components with varied emergence profiles or angled or customized abutments are often required to render the illusion of a crown on an abutment. Angled abutments are used only to improve the path of insertion of the prosthesis or the final esthetic result which often come in 15- 30 degree angles. The angled abutment, which is loaded along the abutment axis, will transmit a significant load to both implant crestal region and abutment screw, proportional to its angle of inclination. As angle increases resistance to fracture decreases because of increased angular load and decreased metal thickness lateral to abutment fixation screw. [4]

CASE REPORT

A 19 year old male patient reported to Department of Prosthodontics, with the chief complaint of missing upper front teeth (Fig1). The teeth were lost due to trauma 2 years back. On clinical examination it was observed that the upper right central incisor, left central incisor, lateral incisor, canine and first premolar were missing. For evaluation of availability of bone the OPG (orthopantomograph) was done showing generalized bone loss at the alveolar crest region (Fig 2). Alginate impressions (Algitex Dental Products of India, Mumbai, India) of maxillary and mandibular arch were made and poured to get diagnostic casts. The treatment options given to the patient included removable partial denture and implant supported prosthesis. The patient demanded fixed replacement of the missing teeth and hence opted for implant prosthesis.

On evaluation of radiographs and diagnostic cast a two stage surgery was planned. Implants of diameter 3.3 mm and length 13 mm (Adin, Dental Implant Systems Limited, Israel) were selected for 11 and 21 region and 3.75 X 16mm implant was selected for the premolar region. Due to inadequate bone height implant was unable to place on the 22 and 23 region. The patient was educated to use an aqueous 0.2% chlorhexidine mouth rinse for 1 minute, 3 times daily for 2 weeks for oral disinfection before implant placement. One hour prior to the surgery, the patient was advised to take antibiotics (Amoxicillin 500 mg, 2 tablets) to reduce the post operative problems.

Surgical protocols of disinfection and sterilization were followed. After the administration of local anesthesia a crestal incision was given. A mucoperiosteal flap was elevated to expose the alveolar crest (Fig 3) and initial osteotomy was done using 1.5 mm pilot drill. The implants were placed using strict protocol of drill sequence. Alloplastic bone graft material (Osseograft, Advanced Biotech Products Ltd, INDIA) was placed to compensate for the deficient labial cortical plate (Fig 4). An OPG was

done to confirm the position of the implant. Cover screw was placed (Fig 5) and the surgical site was closed with 3-0 silk sutures. Patient was given prescription for chlorhexidine gluconate and salt water rinses and postoperative instructions such as adequate rest, application of cold pack (ice) and precautions to be taken to prevent bleeding, suture line opening and pain. After 14 days patient was recalled and the sutures were removed. An IOPA was taken to evaluate the implant placement which was found to be adequate. A removable partial denture was fabricated and adjusted at the intaglio surface was given after 2 weeks of healing. The patient was instructed to wear it as minimal as possible to prevent the possible complication of incision line opening and should not be worn at night.

The second stage was performed after 4 months (Fig 6) and healing cap was placed to develop the required gingival collar and emergence profile. Three weeks later healing cap was removed which showed healed gingival cuff. To get the implant level impression open tray technique was followed using addition silicone impression material (Aquasil Ultra-Dentsply, USA) (Fig 7). The impression was poured in die stone and the cast was made using esthetic gingival mask in the implant area.

Readymade abutments were used for the anterior implants and custom UCLA abutment was planned as abutment option for the premolar implant considering decreased inter arch space available and angulation of the implant (Fig 8). All abutments were placed on the implant analog and metal ceramic crown fixed prosthesis was made (Fig 9). The healing cap was removed and the entire abutments were placed with a large hex driver tip. The prosthesis was cemented with GIC cement (GC Corporation, Tokyo, Japan) (Fig 10). Because of the precise fit between the abutment and the prosthesis, only a minimal amount of cement was needed to place the crown (Fig 11). Patient was recalled every 3 months and evaluated radiographically and

clinically. The rehabilitated site was found to be sound after the examination. To date,

the restoration has been in service for 12 months without complications.



Figure 1: Pre operative view



Figure 2: Pre operative OPG



Figure 3: Elevation of mucoperiosteal flap



Figure 4: Placing bone graft material



Figure 5: Post operative view



Figure 6: OPG done after 4 months



Figure 7: Open tray impression



Figure 8: Abutments positioned on the implants



Figure 9: Implant prosthesis with gingival porcelain



Figure 10: Final prosthesis cemented on to the patient's mouth



Figure 11: Post operative view

DISCUSSION

Ridge deficiency is a serious obstacle in the field of implant dentistry. Many techniques are available to reconstruct the deficient ridge. Many of these techniques are associated with significant morbidity and often require a second surgical site. [5] The use of autogenous iliac crest block grafts has been associated with higher rates of postoperative sequelae and morbidity, often requiring patient hospitalization. [6] The anterior maxillary region often requires both hard and soft tissue restoration. In compromised situations where bone height or width is inadequate at the osteotomy site, implant has to be placed more apically or palatally. In such cases modify the narrower ridge into another bone division using crestal osteoplasty with subsequent placement of bone graft material (e.g. autogenous or demineralized freeze dried bone, synthetic bone substitutes). In very severe cases autogenous graft covered with a membrane for guided tissue regeneration will be carried out but that necessitates additional

surgical intervention and is expensive. Narrow diameter implants with adequate length can be used but which transfer more stress to the crestal bone. Hence to avoid additional surgical procedures angulated or Customized abutments are warranted. [4]

To achieve desired parallelism between implants or teeth, angled abutment can be used. Angulations of as much as 15 degrees are easy to correct with angulated abutment. Greater angulation correction may be possible with either pre angled parts or custom made components. The clinician can use either prefabricated or custom made abutments. While standard sizes and dimensions are sufficient for posterior restorations, such abutments in the anterior maxilla may not lead to an optimal esthetic final result. For support of the surrounding tissues, custom made abutments can be considered for each individual situation. [7] In comparison to stock abutments, custom UCLA abutments provide better potential than for ideal crown contours and peri-implant soft tissue support creating better esthetic results. Moreover a high success

rate was reported in recent years (4 years: 95.8%). [8]

Implants may not be ideally placed due to anatomic limitations, developmental defects, pathology, bone resorption, and long-standing ridge deficiencies. [5] The consequence of this can be off-axial loading, leading to biomechanical problems, loosening, cover screw fracture, fracture of implant, or implant collar. [9,10] Implant malpositioning can lead to poor clinical and prosthetic outcomes by providing an inadequate emergence profile, fracture of the restoration, poor screw-hole positioning, occlusal discrepancies, compromised esthetics and phonetics. [5]

The patient discussed had inadequate bone height and width in the maxillary anterior region. The interarch space was less in the premolar region for the use of normal abutment. Hence bone grafting and customized abutment were chosen as a viable option for the patient. Thus with proper diagnosis and treatment planning even in compromised clinical condition implant prosthodontics can be successful.

CONCLUSION

Implants have been used to support dental prostheses for many decades, but they have not always enjoyed a favourable reputation. This scenario has altered with the advent of endosseous osseointegrated dental implants. They are the nearest equivalent replacement to the natural tooth and are therefore a useful addition in the management of patients with missing teeth due to disease, trauma or developmental anomalies. The ultimate goal of implant treatment is to place implants in the most optimal position compatible with esthetics, phonetics and function. Deformed partially edentulous ridges may compromise ideal implant placement and implant survival. But

with proper diagnosis and treatment planning and post operative maintenance implants can be of great success.

REFERENCES

1. Reikie DF. Restoring gingival harmony around single tooth implants. *J Prosthet Dent* 1995; 74:47-50.
2. Philips K, Kois JC. Esthetic peri-implant site development. *Dent Clin North Am* 1998; 42:57-70.
3. McCarthy C, Patel R, Wragg PF, Brook IM. Dental Implants and Onlay Bone Grafts in the Anterior Maxilla: Analysis of Clinical Outcome. *Int J Oral Maxillofac Implants* 2003; 18:238-241.
4. Gupta A, Jain D, Sangwan A, Chhabra S. Abutment Options for Compromised situation in Esthetic Zone- Case Reports. *J Dent Med Sci.* 2015; 14(8):30-37.
5. Toscano N, Holtzclaw D, Mazor Z, Rosen P, Horowitz R, ToffleMr. Horizontal Ridge Augmentation Utilizing a Composite Graft of Demineralized Freeze-Dried Allograft, Mineralized Cortical Cancellous Chips, and a Biologically Degradable Thermoplastic Carrier Combined With a Resorbable Membrane: A Retrospective Evaluation of 73 Consecutively Treated Cases from Private Practices. *J Oral Implant.* 2010; 36:467-474.
6. Rudman RA. Prospective evaluation of morbidity associated with iliac crest harvest for alveolar cleft grafting. *J Oral Maxillofac Surg.* 1997; 55:2219-2223.
7. Stefan Holst, Markus B. Blatz, Prosthodontic Considerations for Predictable Single- Implant Esthetics in the Anterior Maxilla. *J Oral Maxillofac Surg* 2005;63:89-96, Suppl 2
8. Lewis SG, Llamas D, Avera S, The UCLA abutment: A four-year review. *J Prosthet Dent* 1992; 67:509
9. Rangert B, Jemt T, Jorneus L. Forces and moments on Branemark implants. *Int J Oral Maxillofac Implant.* 1989; 4:241-247.
10. Khraisat A, Abu-Hammad O, Dar-Odeh N, et al. Abutment screw loosening and bending resistance of external hexagon implant system after lateral cycle loading. *Clin Implant Dent Relat Res.* 2004; 6:157-164

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