

IMPLANT PLACEMENT WITH PREDICTABLE GBR IN  
LARGE BONY DEFECT- A CASE REPORT

## ABSTRACT

The replacement of missing teeth with implant borne restorations has become a treatment modality accepted by the scientific community for fully and partially edentulous patients. Advancement in the oral implant treatment leads to predictable survival rates and create important treatment options available. Bone defect associated with lost teeth in anterior maxilla will affect both surgical placement of implant and subsequent prosthetics rehabilitation. Bone defect correction can be carried on using variety of ways include barrier membrane with guided bone regeneration, block grafts etc. This case report describes the management of an anterior missing tooth following implant placement and filling the labial bone defect using particulated bone graft and membrane. After 3 months of healing esthetic crown was placed.

Keywords: Dental implant, Guided Tissue Regeneration(GTR) ,Bone graft

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## INTRODUCTION

The introduction of osseointegration by Branemark and co-workers and replacement of lost teeth by implants have revolutionized oral rehabilitation while significantly advancing restorative dentistry<sup>1</sup>. There are many patients who present with missing teeth. In the anterior region, tooth loss is most commonly a result of a traumatic injury or it is a congenital anomaly. Single missing posterior teeth are usually caused by advanced caries or a failed endodontic procedure and occasionally by a congenital defect. There are several options available for the replacement of a single missing tooth<sup>2</sup>.

The characteristics of the alveolar ridge play an important decisive factor in the success of implant placement. Currently, however, implants are also being placed in sites with ridge defects of various dimensions utilizing the various reconstruction techniques using bone graft, guided bone regeneration orthognathic surgery or bone distraction.

Minor trauma causes loss of alveolus and gingiva. Major trauma can cause extensive vertical and horizontal bone loss<sup>13</sup>. Restoration of missing anterior maxillary teeth is challenging due to compromised esthetics associated with missing teeth itself in addition gradual alveolar bone resorption which will further compromise esthetics<sup>14</sup>.

## CASE REPORT

Here is the presentation of a case where the missing maxillary right central incisor was restored by placement of implant and simultaneous apicectomy procedure and use of bone grafting was done with the adjacent tooth to remove the periapical defect which was spreading towards the implant site.

A 25 year old male patient reported to the department of Peridontology And Oral Implantology, Sri Guru Ramdas Institute Of Dental Sciences And Research complaining of missing upper anterior tooth 11 since 1 year. The tooth 11 was extracted 1 year ago after accident which fractured the crown leaving the roots. The patient insisted for immediate restoration to improve the function and esthetics.

Conducting a thorough medical history, we found that the patient had a good physical condition and denied any systematic diseases or any allergic diseases that were relevant to dental treatment and he had no mucosal lesions, no bleeding disorder, no tobacco smoking, alcohol and drug abuse.

He was informed of all the viable options to replace the missing right central incisor and a detailed written

description of the risks and benefits of the proposed treatment was told followed by a written consent taken from the patient.

The investigation included an intraoral periapical radiograph, orthopantomograph, blood tests which included haemoglobin, bleeding time and clotting time

### Dental History

Questioning the patient reported that tooth 11 was extracted in another hospital 1 year ago. And since then no further treatment was done due to economical issues.

### Clinical Examination

Clinical examination was conducted, and thorough deep examination of both extra and intra oral examination of reported the following:

#### Extra-oral:

No gross facial asymmetry or swelling was detected. No clicking of TMJ or limitation and deviation of opening.

#### Intra-oral:

Hard tissue examination: reveals that tooth 11 was missing. Evaluation of edentulous space shows that the quantity and

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Figure 1. Periapical IOPA showing missing 11 and periapical lesion in 12



Figure 2. Pre-operative Orthopantomograph



Figure 3  
A midcrestal combined with crevicular incisions were given on the implant site to elevate a mucoperiosteal flap.



Figure 4  
As the mucoperiosteal flap was raised a labial bone defect was seen in 12 extending over the region in relation to 11



Figure 5  
Corticotomy was done to remove the defect followed by curettage of the periapical lesion. Apicectomy of the tooth 12 was done



Figure 6  
The speed was adjusted to approx. 1300 rpm at the initial drill with an intermittent pressure of 1 second on the bone and 1 to 2 seconds off the bone, under copious sterile saline irrigation. The implant was placed with its head at crest bone level, and then put the healing screw on the abutment connection area.



Figure 7  
Because of the lack of enough bone, bone regeneration technique was used after implant placement. Bone graft (Bio-oss) was used to fill the bone defect followed by suturing



Figure 8  
Post-operative IOPA was done as shown in



Figure 9  
After an uneventful healing period of 4 months, stage 2 surgery of uncovering of implant was done. Healing abutments were screwed in. At 2 weeks, impression was recorded for full PFM crown. PFM crown was cemented thereafter the laboratory procedures

quality of edentulous area (alveolar bone) was not good. There were obvious bone defect and labial ridge in form of concavity of 11 and 12 as seen on periapical xray and orthopantomograph. The inter-alveolar spaces were enough for restoration.

Soft tissue examinations: The thickness of the soft tissue of the edentulous ridge was assessed at different points of the edentulous space and it was about 2 mm measured by a graduated periodontal probe. The color and texture of mucosa was normal. No obvious mucosal lesions, fibrous connective tissue displacement and other abnormalities were detected. Periodontal status: Oral hygiene was good. No marginal gingival inflammation was detected. No periodontal pockets were detected. No other tooth mobility was found.

Before starting an implant surgery and as a part of treatment plan process, the patient must have an initial radiographic screening which in this case was intraoral peri-apical X-ray (figure1) accomplished by intraoral long cone paralleling technique and a pre operative orthopantomograph.(figure2) The patient understanding of the financial, time, and maintenance requirements were crucial, and these obligations were made clear to the patient before starting the treatment and during subsequent appointments.

Before the surgery, all the supragingival and subgingival calculus was removed and blood screening test were performed.

The patient was informed about the common complications of the implant surgery that could happen, and written consent was taken.

The surgical stent was positioned and the implant site was prepared with correct angulations and depth for implant fixture. A 2mm diameter twist drill was used to drill to the desired depth.

A small, sharp-tipped guiding drill was used to create a precise, minimally invasive initial penetration through the mucosa and into bone to locate the exact position of planned implant.

The osteotomy was started with the initial pilot drill and sequentially deepened with 2.0 and 2.5 mm diameter drills.

## DISCUSSION

Management of an anterior missing tooth can pose a challenge to practitioners. Several options are available with their own advantages and disadvantages.

Endosseous dental implants are a predictable modality of tooth replacement that can improve the dental health and quality of life for many people. Different study conducted by

many researches has reported that, the success and survival rate of dental implant placed in anterior maxilla are almost same to other segment of jaw<sup>3</sup>.

However, there is often inadequate bone to receive and support implants. This can be the result of trauma, periodontal disease, endodontic infection, post-extraction ridge defects, disuse atrophy, etc. Successful implant placement in planed site required enough bone volume of sufficient density to enable an implant of the appropriate size to be placed in a desirable position and orientation<sup>3</sup>.

Placement of bone grafts in conjunction with endosseous dental implant shortens the treatment time without influencing the success rate or increase the complication . The interaction between the graft and the surrounding host bone is very important and is the subject of much research<sup>9</sup>.

In this present case report simultaneous GBR was performed in the maxillary right central and lateral region during implant placement achieving good primary implant fixation and graft stability.The necessity for augmenting the volume of bone is obvious in that implant stability requires optimum contact of the implant with bone over a sufficiently large surface area to ensure good osseointegration<sup>10,11</sup>.

The soft tissue characteristics are equally important as the adequate keratinized mucosa is known to absorb the mechanical stress and retard the inflammatory process. This can be achieved by using the resorbable/nonresorbable barrier membranes and bone substitutes to enhance bone regeneration.

Guided Bone Regeneration is a surgical procedure that utilizes barrier membranes to direct the growth of new bone and gingival tissue at sites having insufficient volumes or dimensions of bone. The present scenario focuses on the application of guided bone regeneration to defective alveolar ridges facilitating the placement of implants<sup>5,6</sup>.

Various studies suggest that GBR results in rapid, clinically relevant bone closure of dental implant dehiscence defect<sup>12</sup>. In this case, on the buccal aspect of implant, a dehiscence type defect with corono-apical and mesio-distal extension of 5 mm was found. The defect was clinically almost completely restored with GBR. GBR concept advocates that the regeneration of osseous defects is predictably attained via the application of occlusive membrane which mechanically excludes non-osteogenic cell populations from the surrounding soft tissues, thereby allowing osteogenic cell populations originating from the parent bone to inhabit the osseous wound. In this case of GBR we have used Bio-Oss biograft. There are numerous materials currently available for treating intrabony periodontal defects including

autografts, allografts, xenografts and alloplasts<sup>4</sup>.

The biological principle of GBR is highly predictable for ridge enlargement or defect regeneration under the prerequisite of a complication-free healing. The harmony of soft and hard tissue was achieved by implant placement with bone augmentation in aesthetically challenging situation. The findings of this case report reveal that this treatment modality ie. GBR, leads to substantial clinical improvement<sup>7,8</sup>.

#### Summary

In the restoration of the maxillary anterior region, the surgeon may be required to use a variety of surgical techniques to obtain a beneficial functional and esthetic result. Specific attention must be given to both the hard and soft tissues of the periodontium in selecting those surgical procedures capable of enhancing esthetics in a particular clinical situation. Minor soft tissue manipulation may create restorative opportunities otherwise not considered possible.

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