# Immediate implant placement with GBR using Alloplast

DR. LANKA MAHESH, DR. SAGRIKA SHUKLA, DR. PRASHANT NANDA AND DR. MANOJ EAPEN

**ABSTRACT**

Immediate implant placement has proved to be a highly successful treatment modality, with a high rate of success and patient acceptance. However, not every site has the ideal bone morphology suitable for immediate implant placement. This necessitates the use of guided bone regeneration techniques either simultaneously or prior to implant placement. Presented here is a case report wherein guided bone regeneration was done simultaneously at the time of immediate implant placement to achieve a desirable outcome.

**INTRODUCTION**

During the last few decades, dental implants have gained immense popularity as an excellent means of replacing missing teeth. The area of focus of late has been to decrease the amount of time necessary to complete implant therapy. Three approaches to achieve this goal have dominated clinical research and practice: immediate implant placement; immediate implant loading; and improving implant surface technology (for promotion of quicker healing and better osseointegration).[1] Implants placed immediately after tooth extraction have the advantage of aiding in preservation of the remaining bone, maintenance of the soft tissue profile, decreased total number of surgical procedures and reduction of comprehensive treatment time.[2]

However, immediate extraction sockets do not always provide an ideal site for implant placement, leaving a few threads of the implant exposed. In most cases, such uncovered threads may be left unattended since no adverse reactions have been observed in the mucosa of such locations.[3] On the other hand, if the defect causes a major part of the implant exposed or compromises implant positioning, guided bone regeneration needs to be considered. Guided Bone Regeneration (GBR) is a predictable and well-documented surgical approach for the treatment of deficient alveolar ridges prior to, or in conjunction with, endosseous implant placement to promote osseous regeneration.[4]

Murray in 1957 stated that there were three things necessary for the new growth of bone: the presence of a blood clot, preserved osteoblast, and contact with living tissue. Melcher and Dreyer[5] investigated the importance of clot establishment and stabilization in GBR, and supported the role of the barrier as

a) protection of the hematoma from invasion by non-osteogenic shields, and

b) stabilization of the hematoma and preventing its distortion by the pressure of overlying tissue.

The membrane used, seal off the bone defect from the surrounding soft connective tissue. This creates a secluded space into which cells only from the surrounding bone can migrate. This principle is referred to as the osteopromotion principle. The barrier provided an isolated environment which the osteogenic process, e.g. osteoconduction, osteoinduction, and osseo-integration can occur undisturbed.

This process is dependent upon the type of bone graft and

**FIG 1:** RCT treated teeth

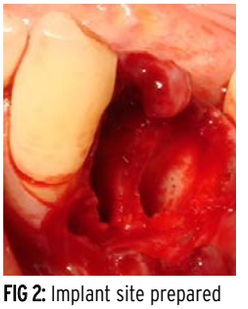

**FIG 2:** Implant site prepared

**FIG 3:** Implants placed

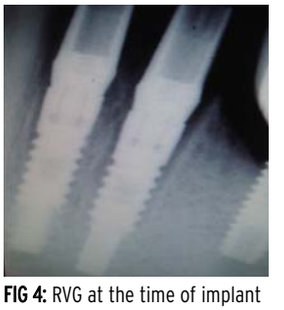

**FIG 4:** RVG at the time of implant placement

**FIG 5:** Novabone placed

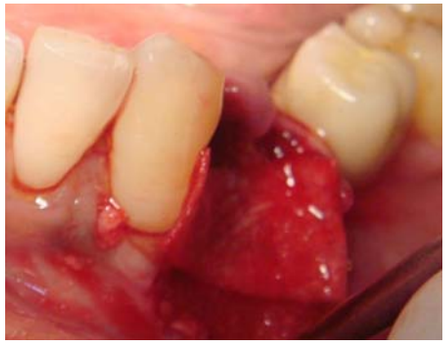

**FIG 6:** Biomend membrane placed

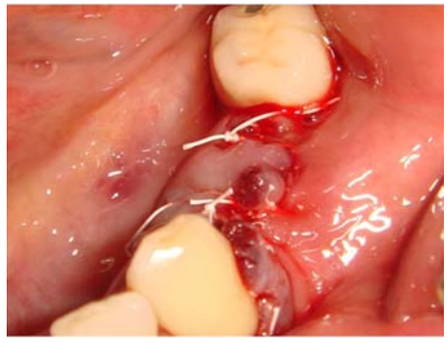

**FIG 7:** Suturing with Cytoplast done

the type of membrane used. Authors have used Novabone bone graft material and Biomend collagen membrane. Novabone is an osteo-conductive and osteostimulative bioactive graft material which is a pre-mixed composite of bioactive calcium phosphate silica particulate and a synthetic absorbable binder. Synthetic bioactive glass particles (Novabone) consist of 45% silica dioxide, 45% sodium oxide, 5% calcium and 5% phosphate.[6]

## CASE REPORT

A 52 years male patient reported to our practice with unrestorable, previously root canal treated teeth numbers 34 and 35. The patient was otherwise systemically healthy. After meticulous treatment planning a decision was made to extract the teeth involved and immediately place two Biohorizon implants in the fresh extraction sockets.

After anaesthetizing the surgical site using 2% Lignocaine solution, a full thickness flap was then elevated prior to atraumatic extraction of both teeth using a periotome. The extractions proceeded without any complication or damage to the buccal plate. There was however a large defect present on the buccal aspect of the extraction sites.

The sockets were then thoroughly debrided of any granulation tissue present. Sequential osteotomy was then done within the sockets to place two 3.5 x 12mm Biohorizon implants into each of the extraction sockets. The implants were drilled into final position at an insertion torque of 50Ncm using a W&H physiodispenser hand piece. Threads were however left exposed on both the implants on the buccal aspect owing to the presence of a large buccal defect.

NovaBone Dental Putty was then used to fill the buccal defect. NovaBone dental putty is a Calcium-Phosphosilicate bone graft material and does not necessitate any mixing prior to placement. It is dispensed in a pre-mixed state and can be placed directly into the defect site from the package. The graft was then covered by a resorbable collagen membrane (Biomend, Zimmer) which was secured in place, the flap was then mobilized to allow for tension free closure using Cytoplast suture material.

The sutures were removed at the end of one week and tissue appeared healthy with no exposure of the GTR membrane placed. At the end of a 3-month healing period, a tissue punch

was used to expose the implants. A gingival former was then placed on each implant for a week after exposure to allow for tissue healing before placement of abutments and final porcelain fused to metal crowns.

## DISCUSSION

The traditional implant protocols have several disadvantages; among these are a relatively longer treatment time and multiple surgeries.[7] The concept of immediate implant placement introduced by Lazzara[8] aimed at overcoming these shortcomings and has thus become a popular treatment modality. However, it is not always possible to have an ideal extraction socket for implant placement, which initiates the use of techniques such as Guided Bone Regeneration for proper esthetic and functional requirement. The biological basis for Guided Bone Regeneration involved fulfillment of bone growth requirement: establishing stable immobile base, allow for release of growth factors, and finally, preserving the blood supply to the area of defects.

Any bone graft material can be used for bone regeneration, however, to fulfill the above biological needs the authors used Novabone® graft material, as it serves several advantages. Novabone®, releases chemicals in the form of ionic dissolution products, or growth factors such as Bone Morphogenetic Protein (BMP), at controlled rates, by diffusion or network breakdown that activates the cells in contact with the stimuli.[9] The cells produce additional growth factors that in turn stimulate multiple generations of growing cells to self-assemble into the tissues in-situ along the biochemical and biomechanical gradients that are present.[9] Novabone® also activates several families of gene such as CD44, IGF2, MMP2, 60S ribosomal protein L6.[10] Also, the putty consistency has been engineered so the material does not flow out of the defect nor crumble inside.[11] Upon mixing novabone with blood or saline, Silicon-oxygen bonds are broken to release silicic acid, which condenses to form a negatively charged gel at the surface of the particles. This gel serves to hold the glass particles in a cohesive mass,[12] which helps in its easy manipulation and prevents migration. The cohesiveness of NovaBone Dental Putty allows for ideal placement and stability even during irrigation. It also has the ability to adhere to normal bone, which helps in its remodeling as well as enables hemostasis.[13] Thus Novabone makes bone enabling complete closure of exposed implant threads by stimulating growth factors and regenerating bone by a unique phenomenon called Osteostimulation.[14] Another advantage is that this graft material resorbs completely, leaving nothing but natural bone.[14]

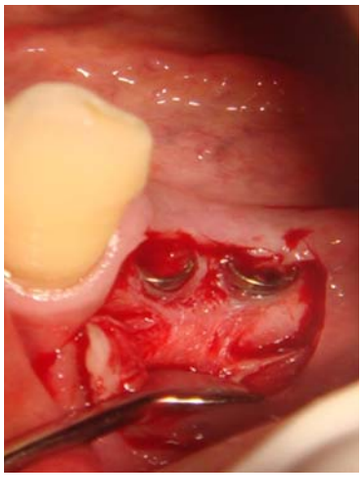

**FIG 8:** Complete regeneration of buccal plate

**FIG 9:** PFMs placed after 3 months

The rationale of using a membrane over a graft material is that it not only functions as a barrier membrane but also helps in further stabilizing the bone graft. GBR using collagen membranes significantly enhances bone regeneration.[15] Also, the collagen membrane is well tolerated by soft tissues and possesses biologic properties that aid in optimal healing.[16] Biomend membrane gives an advantage, that it creates space facilitating graft placement.[17] It also possesses hemostatic properties through its ability to aggregate platelets, which may facilitate early wound stabilization and maturation.[18] Its rigid structural integrity is maintained for approximately 6 to 8 weeks before resorbing.[17] This type I collagen is biocompatible and resorbs through catabolic processes, including degradation of extracellular enzymes and collagenolytic enzymes, and may be replaced by new collagen.[19] This membrane also prevents soft tissue invagination and also results in formation of a cortical plate as early as 6 to 9 months.[17]

## CONCLUSION

In conclusion, Guided Bone Regeneration holds a long term promise and plays a major role in implant reconstruction. Also, Novabone forms, complete bone, resembling trabecular pattern, making long term success of the implant in such bone defects.

## About the AUTHORS

**Dr. Lanka Mahesh** is an implantologist practicing in New Delhi. He is a Fellow and Diplomate of International College of Oral Implantologists (USA) and the Indian Society of Oral Implantologists. He has undergone advanced surgical training at USA and Spain. He has also authored "Practical Guide to Implant Dentistry" published by Quintessence. He has lectured extensively in India and abroad and has numerous publications on implant related topics.

**Dr. Prashant Nanda** runs a private practice in Delhi.

**Dr. Sagrika Shukla** is Postgraduate student in Department of Periodontics, SGT Dental College

**Dr. Manoj Eapen** runs a private practice in Bangalore.