BONE AUGMENTATION USING CGF-A CASE REPORT WITH TWO YEAR FOLLOW UP

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Abstract:
Successful implant treatment requires: Primary stability at placement Integration in a prosthodontically driven position Careful management of the living bone. Bone volume may be inadequate to completely embed the implant Incompletely covered implants may result in complication soft tissue recession inflammation and infection and eventual loss of implant .Bone augmentation with barrier membrane technique has proven to successful to regenerate the bone volume.Concentrated growth factors have shown promising results when used with combination of grafting materials.This case report presents a case wherein the site of implant placement has been incorporated with a mixture of cgf and allograft. A two year follow up shows good tissue thickness and volume.

Keywords: Cgf,allograft,implants

Introduction

Bone augmentation with barrier membrane technique ,the concept of GBR was first described in 1959 when cell occlusive membranes were employed for spinal fusions.[1] A variety of non resorbable and resorbable bone grafting materials have been used in bone augmentation with GBR concept Oral Implantology. From a manufacturing aspect what we should look for is material biocompatibility ,stability over the required duration of barrier function, space maintenance ,exclusion of undesired cell ingrowth and ease of use[2,3,4,5]

The size of the defect also influences the bone healing capacity .In large defects the bone formation is limited to the marginal stable zone with a central zone of disorganized loose connective tissue,thus combined use of bone grafts or bone replacements substitute with cell occlusive barrier membranes are advocated in bone regeneration of larger defects.One such example is eptfe membranes which is considered a standard for bone augmentation. However soft tissue dehiscence is a common complication.[6,7]

Thus bio resorbable membranes were developed. Although these membranes also elicit soft tissue inflammation and soft tissue dehiscence, the communication with the oral cavity accelerates resorption rate thus reduces the contamination of the regenerated bone matrix.[8,9]

Variety and contemporary surgical procedures and dental materials available for reconstruction of body defects and concentrated growth factors is one of the risk-free procedures. Growth Factors are mediators which regulate key processes like tissue regeneration, including cell proliferation and differentiation, synthesis of extracellular matrix, chemotaxis and angiogenesis. Thrombocytes play a major role in repairing of mineralized and soft tissues. The latest approach to Guided Bone Regeneration and Augmentation of the lost bony structures of alveolar ridge is application of the fibrin rich block with concentrated growth factor.[10]

The following case report depicts a case with

anterior missing teeth and was rehabilitated with hard tissue augmentation using CGF mixed allograft and immediate implant placement.

Case report:

A young patient presented with missing upper front teeth to the department of Oral Implantology. The history revealed that the cause of loss of teeth was traumatic injury. After Oral prophylaxis and endodontic scaling, patient was adviced oral implants with lateral augmentation.(figure 1,2)

The patient was pharmacologically managed with prophylactic and therapeutic dose of antibiotics.(amoxicillin 500mg).

On the day of surgery,collection of venous blood (saccos protocol) was done from superficial vein with a 21-gauge needle with all the blood counts in normal range. 9 mL of blood was drawn into each sterile Vacutainer blood collection tube (Greiner Bio-One, GmbH, Kremsmunster, Austria) silicon coated as a serum clot activator. These tubes were then immediately centrifuged in a special machine (Medifuge MF200, Silfradent srl, Forlì, Italy) using a program with the following characteristics: 30 seconds acceleration, 2 minutes at 2,700 rpm, 4 minutes at 2,400 rpm, 4 minutes 2,700 rpm, 3 minutes at 3,000 rpm and 36 seconds deceleration and stopped.

At the end of the process, three blood fractions were identified(figure 3): (1) the upper layer, representing the liquid phase of plasma named platelet poor plasma (PPP), (2) the lower layer, at the bottom of the tube, consisting in free red blood cells (RBC); (3) the middle layer, representing the solid CGF [10]

The placement of implant was conducted in a sterile operating theatre.

Disinfection of the facial skin was done using Povidone – Iodine Solution IP (Betadine) paint. Patient was given an oral mouth rinse,Induction of local anaesthesia was carried out using Lignospan special (2% lidocaine with 1:80,000 Adrenaline) .

After a full thickness flap elevation (Figure 4). A 2 mm pilot drill was used to mark the initial osteotomy sites. Paralleling pin was used to check the parallelism and depth of the osteotomy site. A 3.2mm twist drill was used next and the osteotomy widened . After the preparation of the osteotomy site, a 3.5 x 11 mm implant was placed with the help of physio-dispenser .All the implants were placed at a minimum insertion torque of 25 Ncm assessed by the physio-dispensor(Figure 5).

CGF was removed from test tube, using sterile tweezers and was mixed with the allograft (figure 6a,6b) and then placed into the site and closure was attained using vicryl sutures.

Patient was requested to revisit for suture removal and follow up check ups. Prosthetic phase began with implant level impression procedures. During the waiting period of 6 months (figure 7)sulcus former were placed to attain the gingival silhouette .At the time of fit in,the sulcus formers were removed and impression was made(figure 8) .Customised abutments were placed and torqued at 25 Ncm which is the recommended torque for implant abutment connection for Ankylos ® system A metal-ceramic bridge was fabricated which was autoclaved before cementing and was cemented using zinc-phosphate cement.(Figure 9,10a,10b) Post operative radiographs(Two year follow up) revealed well seated abutment and a stable crestal bone level.(figure 11)

Discussion

When comparing the various available graft materials used with or without a membrane, Giorgio Pagni et al. In his study concluded that biomaterials such as bio-OSS and hydroxyapatite when placed in submerged situations resulted in better healing. Thus, synthetic bone graft materials are being preferred by more clinicians.

CGF, first introduced by Sacco, has recently become popular. CGF is produced by the centrifugation of venous blood as same as PRF. However, the technique is different on centrifugation speed. Unlike PRF, CGF use variable rpm from 2400- 2700 rpm to separate cells in the venous blood, therefore, results in fibrin rich blocks that are much larger, denser and richer in GF than common PRF. This shows better regenerative capacity and higher versatility when using the fibrin rich block.

CGF also shows higher tensile strength, more growth factors, higher viscosity and higher adhesive strength than PRF. CGF can act as barrier membrane to accelerate soft tissue healing or be mixed with bone graft to accelerate new bone formation. [10,11]

In the above mentioned patient it was decided to mix the allograft with CGF and place the graft and then further cover it up with a slow resorbable barrier membrane. Geistlich Bio-Gide® integrates with surrounding tissues to

protect the initial coagulum. The bilayer structure helps in preventing ingrowth of soft tissue into the augmented site, and optimally degrades to allow for the cascade of biologic events leading to regeneration.[12,13]

The post operative radiographs revealed a stable crestal bone level.Patients estheti demands were met,inspite of the excessive axiocoronal length of the bridge which was compensated by the patients thick lips and low smile line,however,it is adviced to strictly follow a prostheticaly driven implant placement irresepctive of the bone architecture.

Conclusion:

This case report presented with a dental trauma that caused an edentulos anterior area. Extensive care must be taken to rehabilitate these sites especially when we suspect fractures and poor density bone. CGF provides a safe ,cost effective alternative to autografts during grafting procedures. CGF can used in other implant case scenarios that include sinus augmentation and ridge preservation. More studies about the effeciency of CGF can validate its use in the future.

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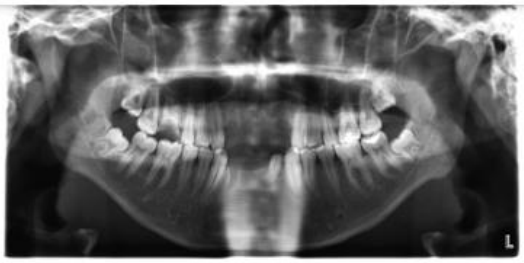


Figure 1:PRE OPERATIVE OPG

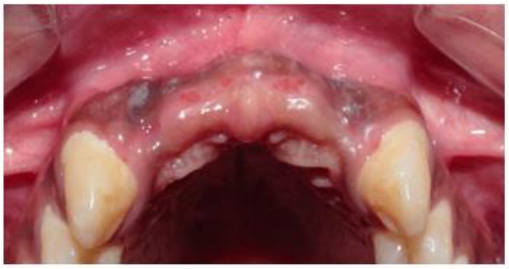


figure 2:PREOPERATIVE INTEROCCLUSAL VIEW

figure 3: CGF collection from patient venous blood

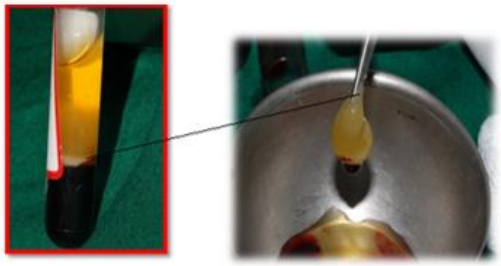


Figure 4:flap elevation

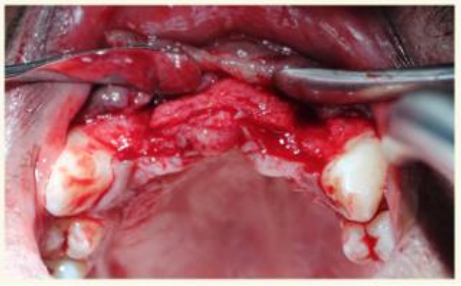
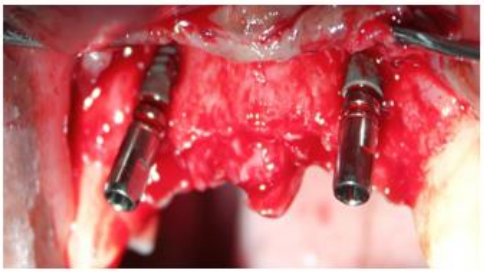


Figure 5: implant placement



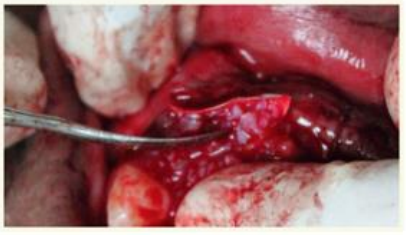


Figure 6a :graft placement

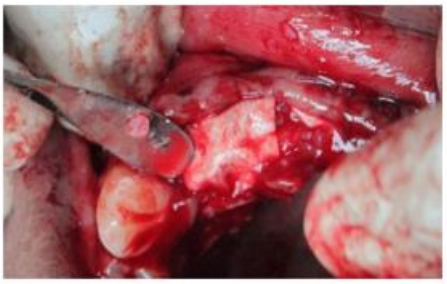


Figure 6b: membrane placement

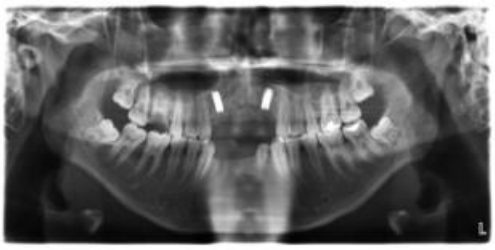


Figure 7: 6 month post operative radiographic view

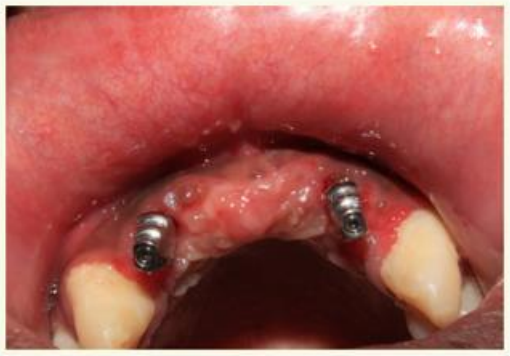


Figure 8: impression coping in place

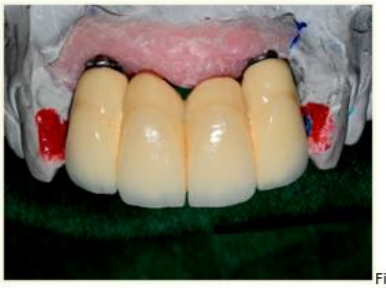


Figure 9: prosthesis

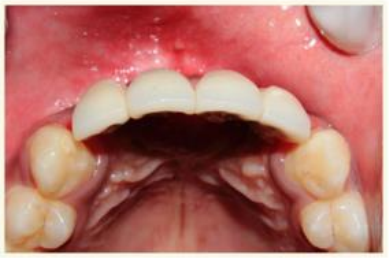


Figure 10a: fit in of the prosthesis

Figure 10b: smile view post cementation

Figure 11: two year follow up