
Discussion

Data reports in the literature seem to demonstrate that GBR procedures are a reliable means for treating dehiscences and fenestrations created or existed during implant placement.

The classical two- stage Branemark procedure, which was developed at the beginning of the 1960, was the safest approach. This treatment modality was well documented in several long term studies and considered the safest approach^{126,127}

For the first time, Fugazzotto⁸³ published an article on this subject in 1997. In this paper, failure and success rates of 626 implants either placed in regenerated alveolar bone or treated with guided bone regeneration to rebuild bone over implant fenestrations or dehiscences were evaluated. The cumulative success rate of implants in function in regenerated bone for 6-51 months was 93.8%.

Fugazzotto⁸⁴ Published another paper in this topic and reported the cumulative success rate of implants in function in regenerated bone for 72-133 months, was about 97.3%.

Survival rates of implants placed in the sites augmented with GBR are consistent with those reported for implants placed into sites not necessitating bone augmentation procedures (Albrektsson et al. 1986; van Steenberghe 1989; van Steenberghe et al. 1990; Lekholm et al. 1994, 1999; Lindquist et al. 1996; Buser et al. 1997; Arvidson et al. 1998; Weber et al. 2000; Leonhardt et al. 2002).

Moreover, as demonstrated by a controlled clinical study included in this review (Zitzmann et al. 2001), where implants were placed both in

sites necessitating simultaneous GBR to correct fenestrations/dehiscences and in sites with enough bone to completely embed implants in the same sample of patients, the survival rates of implants in the two groups did not present significant differences (92% and 97%, respectively).

Several factors could have influenced the quantity of bone formation in a GBR technique. The space-maintaining capability and its duration of the barrier membrane are the most important ones. Dahlin et al. demonstrated that the amount of bone regeneration is determined and limited by the available space. Although some absorbable membranes, such as poly lactic acid and poly glycolic acid (PLA/ PGA)(12,15) or collagen have been applied in the GBR technique, their stiffness and duration have been questioned^{1,3}

Sandberg et al. noted that some resorbable membranes used in their study showed a lack of stiffness, resulting in the collapse of the membrane into the defect area, causing the newly formed bone to take on an hourglass shape. Absorbable membranes generally start to resorb after 4 to 6 weeks. With membrane resorption, the barrier effect could decrease too soon to achieve complete bone regeneration.

In the present study we avoid lack of stiffness by using bone tacks or screws for proper fixation of GBR membrane. The membrane must also protect the clot from being disturbed by movement of the overlying flap during healing to allow good rate of osseointegration.

Various factors may enhance or inhibit osseointegration. Factors enhancing osseointegration include implant-related factors such as implant design and chemical composition, topography of the implant surface, material, shape, length, diameter, implant surface treatment and

coatings, the status of the host bone bed and its intrinsic healing potenti, the mechanical stability and loading conditions applied on the implant, the use of adjuvant treatments such as bone grafting, osteogenic biological coatings and biophysical stimulation.

Gingival bleeding index (BI) is a useful clinical criteria that reflects gingival inflammation, which is generally caused by bacterial pathogens. It is a good marker for clinical follow up of implant treatment. Redness and swelling of the gingival around the artificial root was common to all cases as inflammatory reactions to surgical invasion until about one week postoperatively, but rapidly disappeared after suture removal.¹⁶¹

As, mobility of the implant is the most significant of implant failure i.e. detection of mobility means failure of osseointegration even in the absence of other signs or symptoms. The Gingival Index was used by several authors to assess the peri-implant tissue health and to detect any alterations in color, contour and consistency, while Linde used Bleeding Index instead of Gingival Index as an indicator of inflammation.

In the present study, six cases have shown no mobility throughout the post-loading follow-up period and other cases showed gradual decline in the Mobility Index scores and decrease in Gingival Bleeding indices as well as Probing depth during the follow-up period. This indicated healing of soft tissue attachment around the implant and absence of peri-implant disease due to extensive oral hygiene instructed to the patients. This is in agreement with Linkow et al, who stated that periodontal indices were not directly related to the success or failure of osseointegration of implants. They used for monitoring peri-implant soft tissue.

The per-implant sulcus depth revealed consistent sulcus depths almost over the from one month to six months . It noticed that pocket depths observed in the present study remained within the acceptable physiological range not more than 3.5 mm .significant differences could only be observed when compared to PSD at baseline.these observations came in agreement with study by DeKok et al(2006) they revealed consistent per-implant sulcus depth of 2.23 to 3.15 mm circumferentially around the endosseous Implants.¹⁶²

CBCT has provided the clinician with the ability to store and manipulate radiographic information, this application technique is to plane the placement of endosseous dental implants, the implant length in this study was selected according to CBCT radiographic measurements

Digital radiography was used to assess longitudinal bony changes around dental implants.¹¹⁷ In this study the highest rate of crestal bone resorption had occurred within the first three months from implant loading which was consistent with finding of Araujo et al (2006) they concluded that between one to three months the process of healing continued and the height of crestal bone around the implants was further reduced.¹⁶³

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 study on the application of guided bone regeneration to defective alveolar ridges facilitating the placement of implants.

Alveolar bone defects can be surgically corrected before or at the time of implant placement. The advantage of performing the combined

graft implant procedure in a single step is reduction in the number of surgical intervention and graft stabilization procured by the implant.

The disadvantages of the combined graft implant procedure are graft failure leading to implant failure and deficiency of Osseointegration in the coronal portion of the implant.

In this present case report simultaneous GBR was performed in the single rooted teeth during implant placement achieving good primary implant fixation and graft stability. Six months post operatively considerable increase in the volume of bone was evident on radiograph in the augmented area. Good implant stability was achieved at 6 months postoperatively following placement of the crown with no gingival deformation around the implants. This is facilitated by maintenance of good oral hygiene.

The characteristics of regenerated bone are more dependent upon the bone quality of the receptor bed than on quality of the grafted bone, and in the case of simultaneous implant positioning; the achievement of increased percentage of bone-implant contact is dependent upon this same factor.

The outcome was implant survival described as presence of implant, implant success (according to the criteria in the respective study), absence of clinical implant mobility, absence of implant fracture, absence of progressive peri-implant crestal bone loss as assessed on radiographs without clinical signs of peri-implant infection, absence of peri-implant infection with suppuration.

The survival rate of implants placed into sites with regenerated/augmented bone using barrier membranes varied between 79% and 100% with the majority of studies indicating more than 90% after at least one year of function.

The present study agree with many authors which supported that the GBR technique with bone tacks or screws which has a good clinical and radiographical success this will allow clinicians to obtain more predictable result.