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BONE REGENERATION FOR RE-INTEGRATION OF FAILING IMPLANT: A DENTIST NIGHTMARE.

Dental Science

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ABSTRACT

In order to maintain the level of alveolar bone, dental implants are commonly used in clinical practice for replacement of natural teeth. Its success is based primarily on the extent of osseointegration. Despite of high success rate and stability, failures are bound to occur. One of the factors that may lead to implant failure is the bone volume and poor bone quality. Other factors include overheating, contamination, trauma during surgery, incorrect immediate load indication and occlusal trauma.

Early detection and treatment of progressive bone loss around dental implants by mechanical debridement, antimicrobial therapy and regenerative therapy are the keys to save the failing implants. Failing implants are characterized by progressive bone loss, signs of inflammation and no mobility. The aim of this case report is to analyze the dental failing complication and with the help of newer technique to increase the success rate of failing implant.

KEYWORDS

Dental implant, Osseointegration, Failing implants.

INTRODUCTION

Dental Implant is considered to be an effective treatment modality in the past decades. Majority of studies have shown promising results with success rate ranging from 95-99%[8].

As failures are unpredictable, there are certain factors which has been identified to be of great relevance as risk groups for implant loss considering host response to be at the highest level. According to Esposito *et al*, implant failure is related to immune inflammatory host response, an intense inflammatory process which compromises osseointegration[2]. Maxillary implant failures are observed to be 3 times more than mandible with early failures varying between 15-21%[3].Clinically the failure signs of an implant are the presence of fistula around soft tissue of the implants, purulent discharge, bluish red discoloration of soft tissue and mild discomfort at the implant site. If not treated, there would be a progressive bone loss resulting in failure. Early failures can be best treated by mechanical debridement, antimicrobial therapy and Guided bone regeneration (GBR)[1].

GBR is defined to be a regenerative procedure based on principle of guided tissue regeneration along with barrier membrane placement for blood clot protection and a secluded space for bone regeneration around osseous defect competing with other tissues. Many studies have reported osseous defect treatment with bioactive glass graft material along with collagen membrane[7].

This article highlights a case of failing implant treated with newer technique and regenerative procedure further increasing the success rate.

CASE REPORT

A female patient aged 45years visited the department of Periodontology, Manav Rachna Dental College with missing upper right front tooth which was extracted 1 year back due to caries. The patient was systemically healthy and had good oral hygiene.

A detailed medical and dental history was taken. Radiographic examination was done to assess the periodontal condition. Upper and lower cast was articulated to study the occlusal pattern. A written consent was submitted by the patient to carry out the procedure. Necessary investigations like complete hemogram and CBCT were done. After studying CBCT, implant was decided to be placed in the edentulous area. An osstem implant size 4 X 11.5mm was placed subcrestal under aseptic conditions. Sutures were given at the end of the procedure along with post operative instructions and medications. The patient was recalled after 10 days for suture removal and healing was also found to be satisfactory. After 3 months, patient reported for placement of implant abutment to be followed with prosthesis. During clinical examination, a sinus tract was observed at the apical portion of the region where implant was placed. On palpation implant threads were felt at the labial aspect. After thorough clinical examination and discussion with the patient, decision to salvage the implant (if required after flap reflection) by means of bone graft along Guided Tissue Regeneration (GTR) membrane was decided. Prophylactic antibiotic coverage (Amox 500mg/clavulanic acid 125mg 3 times daily) was started a day prior to the procedure.

Under LA, Incision was given and periodontal flap was reflected to expose the implant. On exposure, buccal bone resorption was noted which was extended till the last thread of the implant.(Figure1) Scaling and Curettage was done with the help of plastic instruments around the implant area. After the complete removal of granulation tissue, surface decontamination was done using diode laser therapy around the implants at 940nm. PerioGlas® (NovaBone Products, LLC, Alachua, Florida, USA)) was placed at the defect (Figure 2), which was further covered with a collagen GTR membrane (Healiguide®, Advanced Biotech Products Pvt. Ltd., Chennai, India) so that surrounding 2-3mm of alveolar bone is covered and the graft is stabilized (Figure 3). Primary wound closure was obtained, using non-resorbable silk sutures (Mersilk®, Ethicon, Johnson and Johnson, India) and the area was covered with periodontal dressing (Coe-pak, G. C. India) for 14days.The post operative instructions were given and medication was continued. Patient was advised to rinse with 0.2% chlorhexidine twice daily for a week and was instructed to avoid brushing on the operated site. The dressing and sutures were removed after 14 days. Oral hygiene instructions were reinforced. Recall was done after 1 month following which patient was put on 6 months recall.

At the end of 6 months follow up, tissue healing was satisfactory. After 9 months, CBCT was performed to have a check on the amount of buccal bone deposition. The amount of bone gain of 0.5mm was reported and the abutment was placed followed by placement of crown (Figure 4). After 12 months from baseline (implant placement), CBCT was repeated and there was a further gain of 0.75mm -1.0mm at the peri-implant area (Figure 5).

DISCUSSION

As previously stated, despite the success rate of 95-99%, failures do occur[10]. The implant failures should be dealt with caution as initiation of treatment for a situation which could be a failure, the condition of the particular implant must be examined.

Meffert, classified unhealthy implant into ailing, failing and failed implants. Ailing implants were those showing radiographic bone loss without inflammatory signs/mobility. Failing were those implants which showed progressive bone loss, inflammatory signs but no mobility while failed were considered to be the implants with progressive bone loss with clinical mobility and loss of function as well[6].

Failure rates correspond to various factors which prevent osseointegration. According to, Lang NP most of the implant failures occurred in preload phase after osseointegration i.e. 88.2%. After loading, failures rate reduces to 7.5% and only 4.2% occurred in immediately loaded implants[5]. This responds to the healing process of various individuals[9]. Various iatrogenic factors contributing to the failure are via contamination, inadequate surgical technique, overheating, occlusal trauma and overloading forces.

The same protocol was followed in a case series by Alghamdi *AS.* He conducted a study in which 18 failed implants were treated successfully[1]. Surface decontamination and curettage of the flap contributed to removal of residual infection and bioactive glass attempted bone regeneration around implants.

On the basis and within limits of systematic review specified by second and third levels of evidence, the following conclusions can be drawn: 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[4].

CONCLUSION

Diagnosis with immediate intervention is important to control the bone loss around the implant and revert the rate of the implant. Treatment modalities discussed in this article are carried out in the above case to salvage a failing implant. Future considerations should focus on proper control of infection and long term follow up.

Fig 1 : Implant exposure

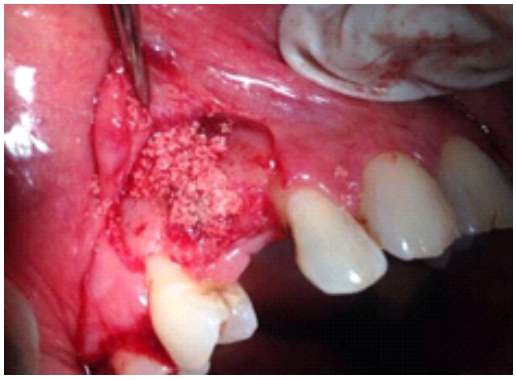

Fig 2 : Bone graft placement

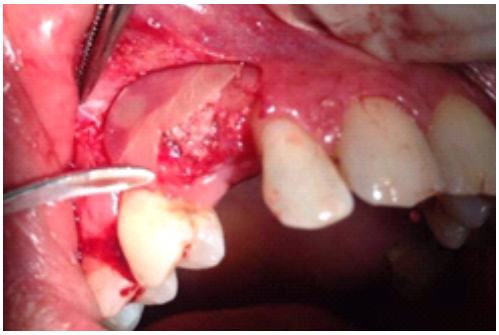

Fig 3 : GTR Membrane placement

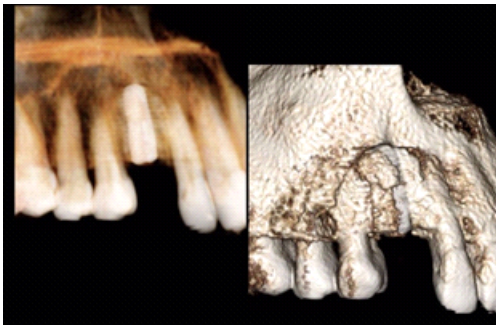

Fig 4 : CBCT after 9 months

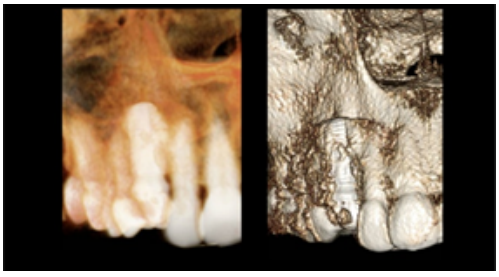

Fig 5 : CBCT after 12 months

Fig 6 : Prosthesis placed

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