Case Study

Peri-Implantitis: Biological Mediators For Regenerative Approach: A Case Report

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ABSTRACT

Various surgical treatment approaches including mechanical debridement alone and also with combination of using different grafting materials (bone grafts, biomaterials like platelet-rich fibrin, rh-BMP-2 etc) is well known and have proven success in eliminating and regenerating the lost periodontal tissues around natural teeth. Surgical approach in treating per-implantitis cases using different biomaterials is not well established yet. The purpose of this case report is to evaluate the role of platelet-rich fibrin (PRF) in treating peri-implantitis case in concern with both hard and soft tissues regenerations.

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INTRODUCTION:
Dental implants have become a reliable and established therapy for missing teeth in varied clinical situations. Success rate of dental implants as a well lasting solution / teeth replacements has been well established by long term follow-up studies, some of which have demonstrated a success rate of 82.9% in decade’s long studies.¹ Yet, despite the high level of success and long-term predictability, achieving success in every single case is not Definite.

Peri-implant disease is one of the most frequent complications affecting both the surrounding soft and hard tissues which lead to loss of the implant. Implant failures has raised evidence, according to the studies²,³ 5% to 11% implants end up as failures. Implant success can be defined as an implant with no pain, no mobility, no radiolucent periimplant areas and undergoes no more than 0.2mm of bone loss annually following the first year of loading⁴ and no more than 1mm of bone loss during the first year in function.⁵

Early implant failures are due to lack of osseointegration between the implant body and the bone while late failures usually occur after a year due to complications which can be categorized as surgical, biological, prosthetic and esthetic.⁶,⁷,⁸,⁹

Risk factors for implant failures include
- History of periodontitis
- Smoking
- Smoking with IL-1 genotype
- Lack of compliance and limited oral hygiene.
- Systemic diseases (diabetes, cardiovascular problems, immunosuppression)
- Soft tissue defects or poor quality of soft tissue at the site of implantation.
- History of one or more implant failures
- Iatrogenic causes (cementitis)

First European workshop on periodontology in 1993 identified and described two patterns of peri-implant disease which includes peri-implant mucositis and peri-implantitis.¹⁰ Peri-implant mucositis is a term used to define inflammatory reaction in the mucosa adjacent to an implant without signs of loss of supporting bone. Peri-implantitis is defined as an inflammatory process that affects the tissues around Osseo-integrated implant in function and results in loss of supporting bone.

The Third European Association for Osseointegration (2012) and American Academy Of Periodontology (2013) agreed that bleeding on probing, suppuration and progressive radiographic bone loss as important diagnostic aspects of peri-implant disease. However, there is no common agreement on diagnostic parameters yet.⁹ Different treatment approaches for peri-implant mucositis therapy include mechanical debridement and also the adjunctive use of antimicrobials (antiseptics, local antimicrobials or systemic).

Various non-surgical protocols have been reported over the years for treatment of peri-implantitis. They usually involve mechanical debridement of the implant surface using curettes, ultrasonic devices, air-abrasive devices or laser. These are either stand-alone therapies or are combined with locally delivered antibiotics or antiseptics such as Chlorhexidine etc. But, so far non-surgical periodontal treatment (NSPT) of peri-implantitis has neither proved to be effective nor predictable.¹¹ At best there are limited improvements in the main clinical parameters, and there is always a clear tendency for disease recurrence. It is therefore prudent to consider surgical intervention, which has proved to be a better treatment approach for peri-implantitis (Third EAO Consensus Conference 2012).¹² The battery of surgical intervention includes access flap therapy for decontamination either chemically or with lasers for shallow suprabony defects or regenerative techniques using bone grafts for circumferential defect with intact walls.¹³

PRF is one of the endogenous regenerative materials, rich in platelets, growth factors and cytokines increasing the healing potential of both hard and soft tissue.¹⁴ The core advantage of PRF preparation is, utilizing patient’s own blood which eliminates possibilities of disease transmission via blood. Gassling et al¹⁵ in vitro study has shown that PRF is a suitable scaffold for breeding human periosteal cells which explains its use in bone tissue engineering applications. Although steadfast evidence to support the use of PRF in peri-implantitis therapy is
scarce right now, it is an emerging therapeutic option because of its excellent biological properties.

**CASE REPORT:**

A 29 year old female patient reported to the department of periodontology with a chief complaint of pus discharge in the implant site in relation to 16 after two weeks of implant placement. (figure 1,2). Clinical examination revealed abscess on the mid crestal region and suppuration with sinus opening on the buccal site with respect to 16. Patient medical history revealed general good health. On radiographic examination, periapical radiograph revealed bone loss of four fixture threads on distal aspect of the implant (figure 3).

Abscess drainage was done as an emergency approach and patient was prescribed with antibiotics (metronidazole 400 mg BD for three days). Patient was scheduled for periodontal flap surgery with a regenerative approach using platelet-rich fibrin to augment the soft tissue and also to promote the healing as PRF has osteopromotion properties. After administration of local anaesthesia, a mid crestal incision was placed, buccal and palatal flaps were elevated to debride and to access the underlying defect (figure 4). Platelet-rich fibrin was placed (figure 5) and flaps were approximated and sutured with 3-0 black silk sutures with interrupted sutures. Post operative instructions were given and patient was prescribed amoxicillin 500 mg T.I.D for five days and aceclofenac P B.D for three days. Sutures were removed after a week and patient was advised to follow oral hygiene instructions with gentle brushing and 0.12% chlorhexidine digluconate rinsing. Follow up visits were scheduled at 1,3,6,9 months and two years. (figure 5-15).
Fig 7: 1 week post-operative on midcrestal aspect

Fig 8: 2 month’s post-operative on buccal aspect

Fig 9: 2 month’s post-operative on midcrestal aspect

Fig 10: 2 month’s post-operative radiograph

Fig 11: 6 month’s post-operative radiograph

Fig 12: 9 months follow up with prosthetic abutment

Fig 13: 9 month’s post-operative radiograph with prosthetic abutment

Fig 14: 2 year’s post-operative with clinical crown

Fig 15: 2 year’s post-operative radiograph
DISCUSSION:

Goal of periodontal therapy is to control the spread and eliminate the periodontal infection and regenerate lost periodontal tissues\textsuperscript{16}. Regenerative therapeutic approaches with a myriad of regenerative materials aim to restore lost cementum, alveolar bone and periodontal ligament. Newer approaches like biological solutions for biological problems are nothing but growth factors which have gained massive attention in this field. Various commercially available bone grafts have been used as restorative materials from past few decades, but they have less predictability, as their regenerative capacity depends on various factors like particle size, donor age, time of harvesting graft and processing. Various biological solutions include enamel matrix derivatives (Emdogain), Recombinant bone morphogenic proteins, platelet derived growth factors, platelet rich plasma (PRP) proven their capability to regenerate the lost periodontal tissues.\textsuperscript{17 - 20}

Platelet-rich fibrin is one of the materials which have proven its ability to regenerate the lost periodontal tissues. In the present case report, PRF was used as a regenerative material and after 1 year of follow up, area immediate to fixture threads demonstrated radiopacity where radiolucency had been observed before. Soft tissues surrounding the implant demonstrated had regained their clinically healthy status (figure 9,10). This can be attributed to the slow release of growth factors from equilateral junctions in the structure of PRF\textsuperscript{21} which keeps pace with wound healing, stimulating the cells participating in the wound healing promoting osteogenesis increasing the speed of healing process.\textsuperscript{22} PRF was chosen as the regenerative material in this case to augment the soft tissue as well as to promote osteogenesis and also there was no circumscribed infrabony defect to warrant the use of a bone graft.

CONCLUSION:

Present case report demonstrated the promising results of treating peri-implantitis with PRF. As there is no outstanding evidence at present, further clinical research is required to evaluate the long term benefits of using PRF as a therapeutic approach in treating peri-implantitis.

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