International Journal of Research and Reports in Dentistry

4(3): 1-6, 2021; Article no.IJRRD.68260

Early Implant Placement with Guided Bone Regeneration in Aggressive Periodontitis: A Case Report and Follow-up

Aamir Godil[1], Arshi Kazi[1*], Kashif Gandhi[1], Aatif Khan[1], Smita Musani[1], Ramandeep Dugal[1] and Sanaa Wadwan[1]

[1]Department of Prosthodontics, M. A. Rangoonwala College of Dental Sciences and Research Centre, Pune, Maharashtra, India.

Authors' contributions

This work was carried out in collaboration among all authors. Author AG conducted the clinical procedures of the study and prepared the manuscript, author AK assisted in clinical procedures and prepared the primary draft of manuscript. Author KG conducted the literature search and gathered evidence for treatment plan. Author AK followed up the case over one year. Authors SM and RD proposed the treatment plan and supervised the protocol. Author SW compiled the clinical photographs at the time of treatment and follow-up. All authors read and approved the final manuscript.

Article Information

Editor(s):
(1) Dr. Roberta Gasparro, University of Naples Federico II, Italy.
Reviewers:
(1) Lu Li, UB School of Dental Medicine, USA.
(2) Alireza Bidar, Islamic Azad University, Iran
Complete Peer review History: http://www.sdiarticle4.com/review-history/68260

Case study

Received 18 March 2021
Accepted 24 May 2021
Published 28 May 2021

ABSTRACT

Background: Aggressive periodontitis (AP) is a rapidly progressing periodontitis occurring in clinically healthy individuals, primarily characterized by rapid attachment loss, bone destruction that occurs early in life and familial aggregation. Although it is a risk factor for peri-implantitis, the documented survival rate of implants in delayed placement protocol is 97.8%.
Case Presentation: This case report describes a multi-disciplinary approach in managing a case of AP with early implant placement and guided bone regeneration for an overall rehabilitation with one year follow up.
Conclusion: The outcomes of this case report indicate successful osseointegration of implants placed by early placement protocol with guided regeneration in aggressive periodontitis.

**Corresponding author: Email: arshikazi2794@gmail.com;*

Keywords: Graft; osseointegration; periodontitis; prosthesis.

ABBREVIATIONS

AP : Aggressive periodontitis
GBR : Guided bone regeneration
FP : Fixed prosthesis
FPD : Fixed partial denture

1. INTRODUCTION

1.1 Aim

Aggressive periodontitis (AP) is represented by rapid attachment loss and bone destruction which occurs in clinically healthy individuals.[1,2] The survival rate of implants in patients with aggressive periodontitis was stated as 97.8% in a recent meta-analysis.[3] It has been well documented that a history of periodontitis is a risk factor for peri-implantitis and the bacteria associated with periodontal disease and peri-implant diseases are similar. Hence, treatment planning inclusive of continued maintenance therapy to reduce risk of peri-implant diseases is necessary for overall implant success and survival [4].

Successful osseointegration is a prerequisite for functional dental implants. The osseointegration is a complex process that can be influenced by several factors. The volume and quality of bone available play a significant role in the success of dental implant therapy and subsequent osseointegration.[5] Noteworthy correlations have been found between bone quality and implant stability parameters, which help clinicians in predicting primary stability before implant insertion; thereby, allowing them to modify the treatment plan in areas where the bone quality is poor [6].

Guided bone regeneration (GBR) is commonly used in combination with the placement of titanium implants. The key principle is placement of a membrane to exclude non□osteogenic tissues from interfering with bone regeneration. Currently, GBR implies the use of different types of membrane (resorbable and non□resorbable) in conjunction with different bone□filling materials. The choice of materials is largely dependent on the size and configuration of the bone defect [7].

The concept of early implant placement with simultaneous contour augmentation in the aesthetic zone was explained by Buser at al in 2017. It requires a 4–8 week healing period following extraction before implants are placed. During this period, several biologic events take place which are in favour for the clinician and the patient, since they simplify the surgical procedure and reduce the risk for post-surgical complications.[8] Early placement plus conventional loading (more than 2 months) is a scientifically and clinically valid protocol with a survival rate of 96%.[9] However, there is inadequate data pertaining to early implant placement in cases of aggressive periodontitis.

This report describes a case of aggressive periodontitis treated with a multidisciplinary approach for an overall rehabilitation with one year follow up.

1.2 Presentation of Case

A 26-year-old male reported with a chief complaint of mobile lower front teeth since two years. The patient had difficulty in eating and was also unhappy with the aesthetics. Patient gave a history of undertaking dental treatment of the same teeth one year ago. Clinical examination revealed generalised loss of attachment, pockets, stains and signs of gingival inflammation with Class II recession in splinted 31, 32, 41, 42 and Miller's Grade I mobility in 36, 46 and Miller's Grade II mobility. Migration of molars was also noticed. The patient was a smoker (3-4 cigarettes/day since, four years) and did not present any systemic health problems. Radiographic examination on an oral pantomograph showed evident signs of aggressive periodontitis presenting an arc-shaped bone loss in relation to lower first molars and incisors. The following treatment plan was proposed for this patient:

Phase I – Pre-Prosthetic Phase (Fig. 1)
Following habit cessation, the pre-prosthetic phase was planned with periodontal therapy for aggressive periodontitis and then by fixed orthodontic treatment.

Phase II – Implant Placement and Guided Bone Regeneration (GBR) (Fig. 2).

Atraumatic extraction of the lower anterior teeth followed by a staged early implant placement.
Phase III – Prosthetic Phase (Fig. 3).

An implant supported cement retained restoration (Fixed Prosthesis: FP-3) was planned to restore the extracted teeth.

A thorough periodontal therapy was carried for the patient and endodontic therapy was done for lower first molars. However, the pockets persisted in spite of a full-mouth phase wise periodontal treatment with scaling and root planning. A full-mouth quadrant wise flap surgery was carried out and grafting was done in sites with vertical or 3-walled bone defects except in the lower anterior region as the incisors were indicated for extraction. The pockets initially had a depth of 10-11mm which improved to 7-8mm after periodontal therapy and maintenance over a period of six months. In order to correct the drifted molars; fixed orthodontic treatment was initiated in the maxillary arch after periodontal stabilisation. Implant placement was planned one year following periodontal therapy.

Atraumatic extractions were carried out for 31, 32, 41 and 42. Following primary soft tissue healing for six weeks, an early implant placement was planned. Prophylactic antibiotic (Tab Ordent, Ofloxacin 200 mg + Ornidazole 500 mg, BD, 5 days, Dr Reddy's Laboratories Ltd, India) was prescribed two days before the procedure. A mid-crestal incision alongside with crevicular incision around 33 and 43 was made, followed by flap reflection. The osteotomy was prepared and two implants of 4.1 X 12 mm (TiZr Roxolid BLT, Straumann®, Switzerland) were placed. The implant stability quotient (ISQ) for both implants was measured using Osstell ISQ instrument (Osstell, A WGH Company, Gothenburg, Sweden). The ISQ values of both the implants at all four sites was greater than 55 at the time of implant placement. A healing abutment of 2mm height was placed over both the implants (Healing abutment, h=2mm, Straumann®, Switzerland). Autogenous graft was harvested from menton using bone scrapper and layered around the implant crest modules. The site was further grafted with small particle xenograft (0.5 mm, Cerabone®, Biotiss Biomaterials, Germany) and covered with a resorbable (amnion) biomembrane (ACTREC- Tata Memorial Hospital, India). The rationale for using a resorbable membrane at the time of implant placement include blood clot protection, avoid additional surgical appointment, stabilizing the particulate graft material, maintaining space and preventing soft tissue in-growth in the defect region.). The flaps were secured with Prolene monofilament suture (Polypropylene Blue Monofilament Non-Absorbable Suture, 4-0, FS-2, Reverse Cutting, Prolene®, U.S.A). The patient was asked to continue with antibiotic regimen and a non-steroid analgesic (Enzoflam, diclofenac 50mg + paracetamol 325mg + serratiopeptidase 15mg, Alkem Laboratories Ltd, India, BD for 5 days) was prescribed. Betadine mouth wash (1% povidone-iodine, Mundipharma Pharmaceuticals Pte Ltd, Singapore) was advised for oral rinses. Suture removal was carried out after two weeks and the patient was given a passively fitting acrylic temporary partial denture. Stage II surgery was carried out after six months and healing abutments of height 5mm (Healing abutment, h=5mm, Straumann®, Switzerland) were placed over both the implants. An open tray impression was made with polyether to receive FP-3 cement retained implant prosthesis, four weeks after soft tissue healing. A minimum uniform gap was maintained between the tissue surface of fabricated prosthesis and the underlying mucosa to ensure hygiene maintenance with proxabrushes, and superfloss- an electrical water irrigation system. The patient was educated about all potential complications related to the prosthesis. Abutments were torqued to 35Ncm followed by cementation of the prosthesis with zinc phosphate cement. Follow up was done at 1 month, 3 months and 1 year intervals.

2. DISCUSSION

Numerous factors govern the choice of fixed restoration in partially edentulous cases. Tooth supported fixed dental prosthesis are widely accepted treatment modalities. Prosthetic options in this case include a conventional fixed partial denture (FPD) with canine as abutments or a fibre reinforced composite resin FPD.[10] However, a more conservative approach; sparing the adjacent teeth would be more acceptable owing to the anatomic location and physiologic importance of canines in the arch.

Implant supported restorations are planned based on the evaluation of existing bone; inter-arch space and the type and number of implants necessary to support the intended prosthesis.[11] In aggressive periodontitis, due to vertical bone loss there is an increased crown height space. FP-3 (Fixed prosthesis -3) are restorations which replace missing crown, gingival colour and portion of the edentulous site. They are generally indicated in such cases to compensate increased clinical height.[12].

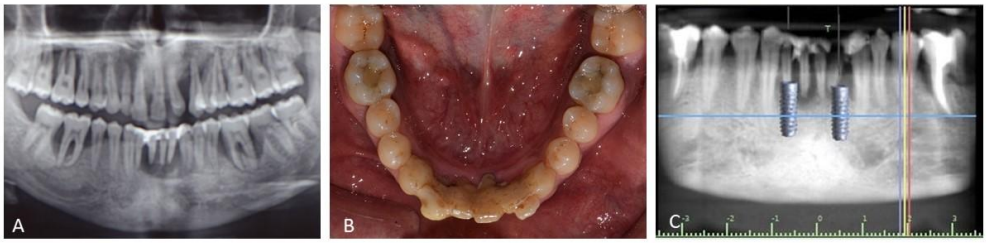

Fig. 1. Pre-Operative; A: OPG showing aggressive periodontitis presenting an arc-shaped bone loss in relation to all first molars and mandibular incisors; B: Occlusal view: mandible showing generalised loss of attachment and pockets, Grade I mobility with 36 46, Grade II mobility (splinted): 31 32 41 42 and generalised stains and signs of gingival inflammation; C: CBCT showing implant planning

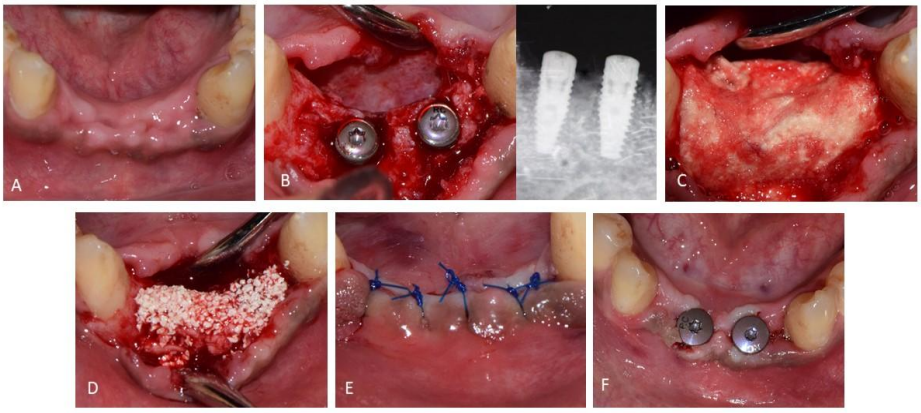

Fig. 2. Surgical phase; A: Healing after 6 weeks post extraction; B: Implant placement: occlusal view and IOPA; C: Grafting with small particle xenograft (0.5 mm, Cerabone®, Biotiss Biomaterials, Germany); D: Graft covered with a resorbable (amnion) biomembrane (ACTREC-Tata Memorial Hospital, India); E: Flaps secured with prolene monofilament suture; F: Stage II surgery: after six months and healing abutments of height 5mm were placed over both the implants

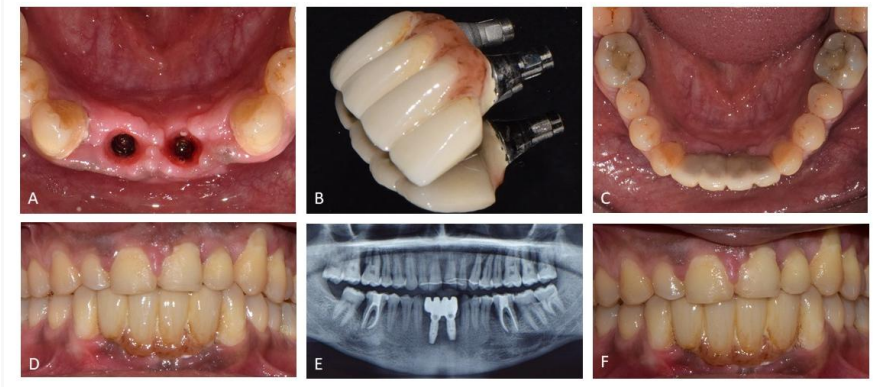

Fig. 3. Prosthetic phase; A: Healing after four weeks; B: Final prosthesis FP-3 cement retained implant prosthesis; C: Occlusal view of final prosthesis after cementation with zinc phosphate cement; D: Frontal view: Final prosthesis in maximum intercuspation immediately after cementation; E: OPG: final prosthesis; F: Follow-up: after 1 year

Megel et al carried out a 10-year study and generalized aggressive periodontitis can be rehabilitated successfully with osseointegrated implants.[13] However, the bone and attachment loss at the implants were higher than in periodontally healthy subjects.[14,15] A number of factors play an important role in the success of implant therapy for an aggressive periodontitis patient. These are mainly; genetic polymorphisms, immune system alterations such as reduced chemotactic response and depression in phagocytosis and superoxide production, mental depression, stress, oral hygiene and tobacco consumption. [16].

Yussif N and Abdel Rahman in a recent systematic review concluded that immediate implantation is a critical treatment modality in aggressive periodontitis and did not find sufficient data on their survival rate.[17] Immediate placement has its own drawbacks such as: compromise in bone quality following immediate extraction, presence of underlying infection, inadequate soft tissue closure and difficulty in obtaining primary stability.[18] Similarly, delayed placement protocol would compromise the bone volume following remodelling and prolong clinical treatment time. Limited literature reports have documented early implant placement protocol in patients with AP. In this case, an early placement protocol with guided bone regeneration was chosen over the conventional delayed placement protocol. In early placement, healing of soft tissue occurs quickly providing 3–5 mm of keratinized mucosa at implant site. It is advantageous as it provides a thick mucoperiosteal flap for implant surgery, with increased vascularity, improved healing capacity, and reduced need for soft tissue augmentation. As the extraction site in aggressive periodontitis is infectious, early placement will provide sufficient time to resolve and reduce bacterial risk at the future implant site. Also, new bone formation will take place in the apical portion of the socket enabling an ease of implant placement as compared the immediate implant placement protocol.[8] Guided bone regeneration ensures adequate peri-implant bone support and volume and clinically acceptable outcomes.[19] After one year follow-up, 1mm crestal bone loss was seen radiographically around both implants which was within the acceptable range.[20] The soft tissue contours and probing depths were favourable and within acceptable range. Based on the outcomes of this case report and early placement protocol with guided bone stated partially edentulous patients treated for regeneration can be successfully employed for patients in aggressive periodontitis.

3. CONCLUSION

The outcomes of this case report indicate successful osseointegration of implants placed by early placement protocol with guided regeneration in aggressive periodontitis. However, long term follow-up and assessment of peri-implant radiographic changes over time will provide a better insight on the success of this treatment modality.

CONSENT

Informed consent was obtained from the patient at the beginning of the treatment.

ETHICS APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Joshipura V, Yadalam U, Brahmavar B. Aggressive periodontitis: A review. Journal of the International Clinical Dental Research Organization. 2015;7(1):11.
2. Bouziane A, Hamdoun R, Abouqal R, Ennibi O. Global prevalence of aggressive periodontitis: A systematic review and meta□analysis. Journal of Clinical Periodontology. 2020;47(4):406-28.
3. Theodoridis C, Grigoriadis A, Menexes G, Vouros I. Outcomes of implant therapy in patients with a history of aggressive periodontitis. A systematic review and meta-analysis. Clinical oral investigations. 2017;21(2):485-503.
4. Geisinger ML, Grosso KC, Kaur M, Arraj RV, Basma H, Ogdon D, Geurs NC. Clinical Decision Making for Primary Peri□Implantitis Prevention: Practical Applications. Clinical Advances in Periodontics;2020.
5. Turkyilmaz I, McGlumphy EA. Influence of bone density on implant stability parameters and implant success: a

retrospective clinical study. BMC Oral Health. 2008;8(1):1-8.
6. Gowd MS, Shankar T, Ranjan R, Singh A. Prosthetic consideration in implant-supported prosthesis: a review of literature. Journal of International Society of Preventive & Community Dentistry. 2017;7(Suppl 1):S1.
7. Elgali I, Omar O, Dahlin C, Thomsen P. Guided bone regeneration: materials and biological mechanisms revisited. European journal of oral sciences. 2017;125(5):315-37.
8. Buser D, Chappuis V, Belser UC, Chen S. Implant placement post extraction in esthetic single tooth sites: when immediate, when early, when late?. Periodontology 2000. 2017;73(1):84-102.
9. Gallucci GO, Hamilton A, Zhou W, Buser D, Chen S. Implant placement and loading protocols in partially edentulous patients: A systematic review. Clinical oral implants research. 2018;29:106-34.
10. Singh K, Gupta N, Unnikrishnan N, Kapoor V, Arora D, Khinnavar PK. A conservative treatment approach to replacing a missing anterior tooth. Case reports in dentistry. 2014;2014.
11. Rasaeipour S, Siadat H, Rasouli A, Sajedinejadd N, Ghodsi S. Implant Rehabilitation in Advanced Generalized Aggressive Periodontitis: A Case Report and Literature Review. Journal of Dentistry (Tehran, Iran). 2015;12(8):614.
12. Misch CE, Judy KW. Classification of partially edentulous arches for implant dentistry. Int J Oral Implantol. 1987;4:7–13.
13. Mengel R, Behle M, Flores-de-Jacoby L. Osseointegrated implants in subjects treated for generalized aggressive periodontitis: 10-year results of a prospective, long-term cohort study. J Periodontol 2007;78:2229-2237.
14. De Boever AL, Quirynen M, Coucke W, Theuniers G, De Boever JA. Clinical and radiographic study ofimplant treatment outcome in periodontally susceptible and non-susceptible patients: A prospective long-term study. Clin Oral Implants Res 2009;20:1341-1350.
15. Kim KK, Sung HM. Outcomes of dental implant treatment in patients with generalized aggressive periodontitis: a systematic review. The journal of advanced prosthodontics. 2012;4(4):210-7.
16. Monje A, Alcoforado G, Padial□Molina M, Suarez F, Lin GH, Wang HL. Generalized aggressive periodontitis as a risk factor for dental implant failure: A systematic review and meta□analysis. Journal of periodontology. 2014;85(10):1398-407.
17. Yussif N, Rahman AA. Is immediate implant placement advantageous for the management of aggressive periodontitis patients in maxillary esthetic zone? An update of systematic reviews. Journal of Osseointegration. 2020;12(1).
18. Lanza A, Scognamiglio F, Femiano F, Lanza M. Immediate, early, and conventional implant placement in a patient with history of periodontitis. Case reports in dentistry;2015
19. Parma-Benfenati S, Tinti C, Romano F, Roncati M, Aimetti M. Long-Term Outcome of Surgical Regenerative Treatment of Peri-implantitis: A 2-to 21-Year Retrospective Evaluation. International Journal of Periodontics & Restorative Dentistry. 2020;40(4).
20. Adell R, Lekholm U, Rockler B, Brånemark PI. A 15-year study of osseointegrated implants in the treatment of the edentulous jaw. Int J Oral Surg. 1981;10:387–416.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/68260