Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.comdoi: 10.21276/jamdsr Indian Citation Index (ICI) Index Copernicus value = 91.86

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Case Report

Guided bone regeneration procedure for implant placement in the esthetic zone: A Case Report

[1]Vipulkumar Govindrao Diwan, [2]Jyoti Tembhurne, [3]Manish Chauhan, [4]Arti Gangurde, [5]Hemraj Wani, [6]Saurabh Danane, [7]Priya Agrawal, [8]Rajat Nahar

[1,5,6]3rd year post graduate student, [2]Professor and Head of Department, [3,4]Associate Professor, [7]2nd year post graduate student, [8]Assistant Professor, Department of Prosthodontics, Government Dental College and Hospital, Mumbai, Maharashtra, India

ABSTRACT:

Introduction: In anterior maxillary region where bone is porous, clinician face challenge to place implants. Guided bone regeneration has satisfactorily come to rescue when dealing with bone in this aesthetic region. Meticulously following the principles of GBR can increase the survival rate of implant up to 95% in this region. **Case Report**: A 27 years old male patient with the chief complaint of poor esthetics due to missing central incisor was rehabilitated with implant supported fixed partial denture. Due to defect in buccal bone, guided bone regeneration was done using autograft and xenograft. **Conclusion**: Guided bone regeneration can help clinician to practice implants in esthetic zone successfully. One should meticulously follow the principles of guided bone regeneration.

Key words: Guided bone regeneration, implant, esthetic zone.

Received: 18 February, 2022 Accepted: 25 March, 2022

Corresponding author: Vipulkumar Govindrao Diwan, 3rd year post graduate student, Department of Prosthodontics, Government Dental College and Hospital, Mumbai, Maharashtra, India

This article may be cited as: Diwan VG, Tembhurne J, Chauhan M, Gangurde A, Wani H, Danane S, Agrawal P, Nahar R. Guided bone regeneration procedure for implant placement in the esthetic zone: A Case Report. J Adv Med Dent Scie Res 2022;10(4):97-101.

INTRODUCTION

Esthetics concerns have increased over the period of time. Edentulism pertaining to anterior esthetic zone has brought advancements in the field of fixed restorations.Implants successfully rehabilitate form, function and esthetics while restoring patient's confidence.[1]The treatment comprises of surgically placing the implant that simulate the root form of the tooth in first step and then loading the implant once the healing is complete. There are several different loading protocols according to time like immediate, early and late.[2]For successful implant therapy adequate alveolar ridge dimensionsand bone quality is essential which canhold the implant and provide good esthetics and proper function. A lack of horizontal and vertical bone at implant sites causes numerous problems specially in the esthetic zone.[3]

In anterior maxillary region usually, fine trabecular bone is overlayed by porous cortical bone.[4] This quality of bone often imposes challenge to the clinician with implant placement. Guided bone regeneration has satisfactorily come to rescue when dealing with bone in this aesthetic region. Meticulously following the principles of GBR i.eprimary wound closure, angiogenesis, space creation/maintenance, and stability ofboth the initial blood clot and implant fixture (PASS) has increased implant survival to about 95% in this region.[5-7]

This case report highlights the implant placement in the anterior maxilla using a minimal guided bone regeneration procedure.

CASE REPORT

A 27 years old male patient reported to the Department of Prosthodontics with the chief complaint of poor facial appearance on smiling due to missing maxillary right central incisor. Patient had history of trauma six months back and history of fracture with maxillary right central incisor. Subsequently, extraction was done with remaining root piece 5 days after trauma. Since then, patient was partially edentulous. There were no other relevant dental and medical histories. The patient's family history was non-contributory, whereby the

confounding environmental and genetic risk factors were deemed absent.

Oral prophylaxis was done. Oral hygiene instructions were given to the patient. In subsequent visits oral hygiene maintenance was satisfactory. On intraoral examination the gingival and periodontal status of the patient was apparently healthy. The patient was explainedabout the varioustreatment modalities available along with their advantages and disadvantages. These included removable partial denture, tooth supported fixed partial denture and implant prosthesis. Taking into consideration the esthetic demandsin the anterior region and thepatient's request, for an implant-based fixed prosthetic rehabilitation, was planned.

Treatment plan: Diagnostic impression were made with alginate and impression were poured in dental stone. Casts were mounted on semiadjustable articulator (Hanau wide vue). CBCT was done with maxillary arch.

CBCT showed edentulous space in the region of maxillary right central incisor with bone width of 5mm corresponding to the level of 2mm below the crest of the ridge. Available vertical height was 13mm. Buccal concavity was seen at the edentulous space region. Bone in the edentulous area was noted to beof D3 type. Implant size of 3*10 mm was decided.

A written informed consent was obtained from the patient before the surgical procedure.

SURGICAL PROCEDURE

The surgical site was anesthetized by local administration of 2% lignocaine hydrochloride (XICAINE, ICPA Healthcare products Ltd.) with 1:80,000 adrenaline. After the patient presented subjective and objective symptoms of anaesthesia a conventional mid crestal incision was made at the edentulous space.

Crestal incision was placed slightly on the palatal side and the mucoperiosteal flap was reflected.

The bone width was 3.5mm and a labial concavity in the bone was noted.

The lance drill was made using Osstem taper kit and intraoral periapical radiograph was taken with paralleling pin placed in drilled socket to evaluate the parallelism. Sequential drilling was done till 3.00 *10 mm and osteotomy was completed.

An implantfixture(Osstem TS 3*10) was placed with an adequate torque of 30N, and coverscrew was placed.Buccal thread hue was visible, hence guided bone regeneration procedure was performed.

First the periosteal releasing incision was given.Autogenous bone was scraped from adjacent area using bone scraper which was mixed with xenograft(Ti Oss manufactured by Obelis SA, south Korea) and blood and saline was added to hydrate the graft.Decortication was done in area where grafting was to be done.

The membrane(Fix Gide-GTR by SYNERHEAL Pharmaceuticals, Chennai.) was sutured on palatal flap first for stability. The graft was placed in the defect and over the implant area.

Afterwards, the membrane was placed over it and periosteal suturing(resorbable) was done to stabilize the membrane. Horizontal mattress suture was given forflap closure, followed by interruptedsuturing to achieve water tight closure.

POST OPERATIVE CARE

Amoxycillin and clavulanic acid combination 625 mg and aceclofenac sodium 50 mg was prescribed for 7 days. The patient was advised to do warm saline gargles for the initial 15 days to promote wound healing. Patient was instructed to avoid any undue stresses and forces on the surgical site. The patient experienced minimal post-operative discomfort and no complications were reported. After 15 days the sutures were removed.

Second stage surgery: After the healing period of six months the patient was recalled and IOPA radiograph was taken. Radiograph showed the signs of osseointegration.For second stage surgery partial thickness flap technique was used and cover screw was removed. Osstem healing abutment of size 5*5mm was placed followed by healing period of 15 days.

PROSTHETIC PROCEDURE

After second stage surgery healing was found to be excellent and healthy gingival tissue was formed around the healing abutment. An open tray impression coping(Osstem mini) was selected and an open tray impression was made using putty and light body (Aveu gum by Avue). Impression was poured and jig was made using pattern for jig try in and evaluated by IOPA radiograph. In subsequent visits metal trial and bisquetrial were done for custom made abutmentand evaluated. A cement retained metal ceramic crown was fabricated and cemented using glass ionomer cement.(GC Fuji Type I)

Fig 1: Incision given and flap raised.
Fig 2: Implant and cover screw placed.


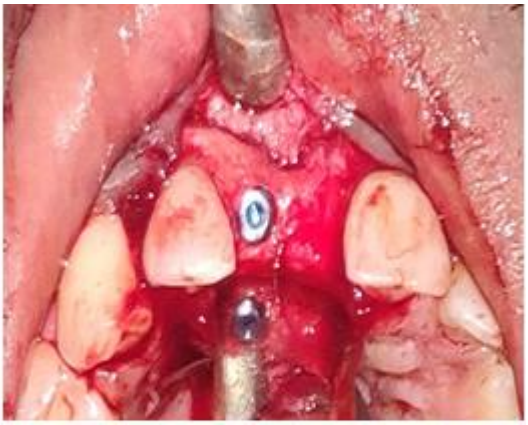

Fig 3: IOPA of implant placed.
Fig 4: Particulate graft placed.

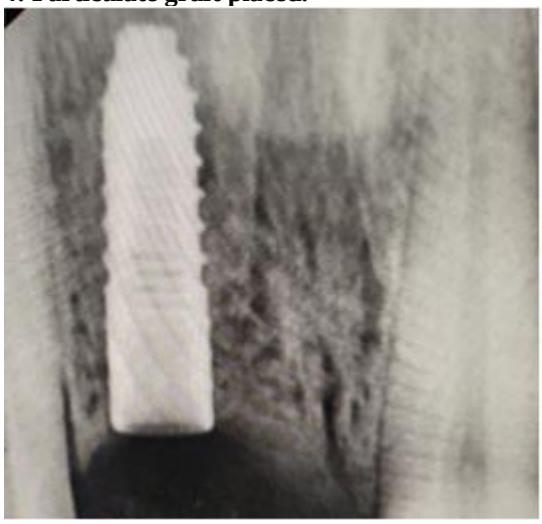


Fig 5: Resorbable suture placed.
Fig 6: Post operative surgical site.

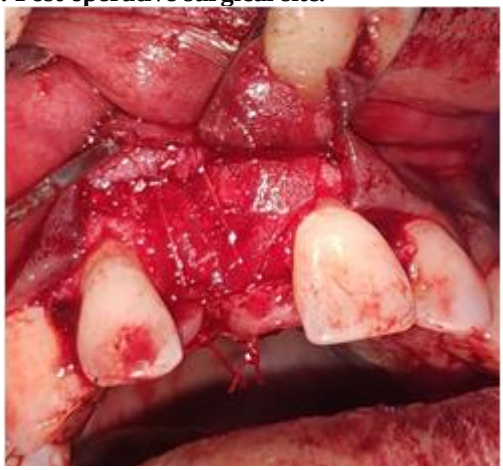


Fig 7: Jig trial.
Fig 8: Metal try in.


Fig 9: Final restoration.
Fig 10: Post operative photograph.


DISCUSSION

In case of maxillary anterior implants, chances of buccal bone resorption and subsequent mucosal recession is very common. Therefore, it is very important to respect the biology of the surrounding tissue and plan a prosthodontically driven implant placement.[8] Meticulous preoperative evaluation of the dimension of residual ridge is very important to develop an appropriate placement strategy andto preserve adjacent anatomical structures. [9]

Zang et al in a CBCT based study reported that dimension of alveolar ridge in anterior maxillary region is approximately 18 ~ 19 mm in height and 8 ~ 9 mm in width for the selected population. Due to presence of a buccal undercut the risk of alveolar cortical plate perforation andsurgical complications increase manifold. Therefore, an additional grafting procedure should be considered when implant placement in anterior maxilla is planned.[10]

Guided bone regeneration (GBR) is a surgical procedure done to increasealveolar bone volume in edentulous area where the implant is to be placed or around already placed implants. The principle of GBR is based on the principles of guided tissue regeneration. In GBR, Autogenous bone is considered as the "gold standard" because of its osteogenic, osteoconductive and osteoinductive properties. Ease of availability, absence of antigenic properties adds on to the benefits of autogenous graft.[11] The need of another surgical site to harvest the bone graft has been one of the major reasons that this procedure is not practiced regularly.

Allografts along with xenografts have been successfully used for guided bone regeneration in bone augmentation.[12]However, risk of infectious disease transmission, such as for human immunodeficiency virus (HIV) and Hepatitis B and C prevail while using them.[13]Though tissue processing techniques like sterilization, mechanical debridement, ultrasonic washing and gamma irradiation can help alleviate these problems.[14]

Dental implants placed with GBR using deproteinized bovine bone mineral (DBBM) granules havebeen shown to achieve satisfactory long-term esthetic and functional outcomes.[15-18] A study by Chen et al indicated that thickness of facial hard tissue showed more reduction if thick post operative grafting was done. This may be due to difficult angiogenesis in thick graft and thus deficient blood supply. This bone loss was majorly seen in first nine months postoperatively.However, the major drawback with particulateDBBM may be the unfavourable mechanical propertiesand poor resistance to collapse.[19]

CONCLUSION

It can be concluded from the case that success of implants placed in esthetic zone can be increased by guided bone regeneration. If all the principles of grafting are meticulously followed, defects in anterior maxilla and the poor quality of bone can be successfully dealt with to deliver better quality of healthcare to patients.

SOURCE OF SUPPORTING

Nil

CONFLICT OF INTEREST

None

REFERENCES

1. Kumar NS, Sowmya N, Mehta DS, Kumar PS. Minimal guided bone regeneration procedure for immediate implant placement in the esthetic zone. Dent Res J. 2013;10(1):98-102.
2. Hudieb M, AlKhader M, Mortaja S, Abusamak M, Wakabayashi N, Kasugai S. Impact of bone augmentation of facial bone defect around osseointegrated implant: a three-dimensional finite element analysis. Dent J. 2021;9(10):114.
3. Gelb DA. Immediate implant surgery: three-year retrospective evaluation of 50 consecutive cases. Int J Oral Maxillofac Implants. 1993;8(4):388-99.
4. Buser D, Dula K, Lang NP, Nyman S. Long-term stability of osseointegrated implants in bone regenerated with the membrane technique. 5-year results of a prospective study with 12 implants. Clin Oral Implants Res. 1996;7(2):175-83.
5. Fugazzotto PA, Shanaman R, Manos T, Shectman R. Guided bone regeneration around titanium implants: report of the treatment of 1,503 sites with clinical reentries. Int J Periodontics Restorative Dent. 1997;17(3):293-9.
6. Zitzmann NU, Scharer P, Marinello CP. Long-term results of implants treated with guided bone regeneration: A 5-year prospective study. Int J Oral MaxillofacImplants. 2001;16:355-366.
7. Blanco J, Alonso A, Sanz M. Longterm results and survival rate of implants treated with guided bone regeneration: A 5-year case series prospective study. Clin Oral Implants Res.2005;16:294-301.
8. Papaspyridakos P. Implant success rates for single crowns and fixed partial dentures in general dental practices may be lower than that achieved in well controlled universities and specialty settings. J Evid Dent Pract.2015;15:30-2.
9. Eufinger H, Konig S, Eufinger A. The role of alveolar ridge width in dental implantology. Clin Oral Investig. 1997;1(4):169–77.
10. Zhang W, Skrypczak A, Weltman R. Anterior maxilla alveolar ridge dimension and morphology measurement by cone beam computerized tomography (CBCT) for immediate implant treatment planning. BMC Oral Health. 2015;15(10):65.
11. Nasr HF, Aichelmann-Reidy ME, Yukna RA. Bone and bonesubstitutes. Periodontol.1999;19:74-86.
12. Zhao R, Yang R, Cooper PR, Khurshid Z, Shavandi A, Ratnayake J. Bone grafts and substitutes in dentistry: A review of current trends and developments. Molecules. 2021;26(10):3007.
13. Palmer, S.H.; Gibbons, C.L.M.H.; Athanasou, N.A. The pathology of bone allograft. J. Bone Jt. Surgery. Br. Vol. 1999;81:333–35.
14. Kao, S.T.; Scott, D.D. A review of bone substitutes. Oral Maxillofac. Surg. Clin. North Am. 2007;19:513–21.
15. Benic GI, Bernasconi M, Jung RE, Hammerle CH. Clinical and radiographic intra-subject comparison of implants placed with or without guided bone regeneration: 15-year results. J Clin Periodontol.2017;44:315-25.
16. Buser D, Chappuis V, Bornstein MM, Wittneben JG, Frei M, Belser UC. Long-term stability of contour augmentation with early implant placement following single tooth extraction in the esthetic zone: a prospective, crosssectional study in 41 patients with a 5- to 9-year follow-up. J Periodontol.2013;84:1517-27.
17. Meijndert CM, Raghoebar GM, Meijndert L, Stellingsma K, Vissink A, Meijer HJA.Single implants in the aesthetic region preceded by local ridge augmentation; a 10-year randomized controlled trial. Clin Oral Implants Res 2017;28:388-95.
18. Vignoletti F, Sanz M. Immediate implants at fresh extraction sockets: From myth to reality. J Periodontol.2000;66:132-52.
19. Chen H, Gu T, Lai H, Gu X. Evaluation of hard tissue 3-dimensional stability around single implants placed with guided bone regeneration in the anterior maxilla: A 3-year retrospective study. J Prosthet Dent. 2021.
20. Chen H, Gu T, Lai H, Gu X. Evaluation of hard tissue 3-dimensional stability around single implants placed with guided bone regeneration in the anterior maxilla: A 3-year retrospective study. J Prosthet Dent. 2021:S0022-3913(21)00097-4.