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Rehabilitation of missing maxillary anterior teeth using dental implants with simultaneous bone grafting- A case report.

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Abstract

Implant rehabilitation is a predictable and prospective option for replacement of missing dentition in partially edentulous individuals especially in the Esthetic zone. The successful osseointegration of dental implants depends greatly on the evaluation of both the quantity and quality of bone. Bone abnormalities consequent to the loss of teeth in the anterior maxilla will have an impact on the mode of implant placement and its restoration thereafter. Various grafting methods have been employed for the treatment of these bone defects, including guided bone generation, onlay bone grafts etc. This case report describes the procedure in which the missing anterior teeth were restored with dental implants and the bony defect was filled using particulated bone graft and Titanium reinforced barrier membrane.

Keywords: Anterior maxilla; Aesthetic implant restoration; bone graft; Dental implant

Introduction

Rehabilitation of missing maxillary anterior teeth is challenging, considering the need to satisfy the aesthetic requirement of the patient. Generalized or localized bone defects of the anterior alveolar ridge, due to atrophy, Periodontal disease, trauma, congenital defects, etc. may provide inadequate bone volume which may render the implant placement unfeasible or incorrect from a functional and aesthetic point of view. To increase the local bone volume in deficient areas, a variety of

techniques have been proposed, including guided bone regeneration, alveolar distraction osteogenesis, autogenous bone grafts and so on.[2] The most often used method for replacing missing bone among these is guided bone regeneration (GBR). In this case report, guided bone regeneration is used in conjunction with bioactive synthetic bone graft and titanium mesh, which is trusted for the repair of atrophic alveolar ridges. Concurrent bone grafting and dental implant insertion also significantly shorten treatment duration without raising complications or lowering success rates.[3]

Procedure

An 18yearold male patient reported to the Department of Prosthodontics, Government Dental College, Thiruvananthapuram with chief complaint of missing front teeth for 1 year and needed replacement for the same. The patient had lost his teeth in a road traffic accident. On intraoral examination, the labial plate had undergone severe resorption making it inadequate for implant placement alone. Radiographic evaluation also revealed bone deficit. (Figure 1,2 and 3)

Figure 1: Extraoral preoperative view-Frontal and profile views.

Figure 2: Intraoral pre-operative view

Figure 3: Orthopantomogram

The recommended course of action included the simultaneous implantation of a bioactive synthetic bone graft with a titanium-reinforced micropore poly tetrafluoro ethylene (PTFE) membrane and the installation of four implants measuring 3 mm by 13 mm (2 pieces each) in the region of the maxillary incisors. The patient received antibiotic prophylaxis one hour prior to surgery. A crestal incision was made along the maxillary alveolar ridge from the mesial side of tooth 13 to the mesial side of tooth 23, extending as a sulcular incision on either side (Figure 4 and 5). This was done after intra- and extraoral antisepsis as well as local anesthesia (2% lignocaine). To reveal the natural bone, a full-thickness mucoperiosteal flap was reflected up to the mucogingival junction. Sequential drilling was used to prepare the osteotomy site, and an expansion screw was used to enlarge the area. Four implants, each measuring 3 x 13 mm, were then inserted (Figure 6). In the implant site with labial bone defect, bioactive synthetic bone graft (Nova Bone Porous granules) was deposited by a loading gun provided by the manufacturer followed by Titanium reinforced PTFE membrane. (Figure 7,8and 9). The flap was repositioned without tension, and absorbable sutures were placed for closure. (Figure 10). Radiograph was obtained to assess the position of implants placed. (Figure 11). After 2 weeks, a review was done with removal of the PTFE membrane. (Figure 12 and 13). Regular follow up was done on the 21st day and at 3 months. (Figure 14 and 15).

Figure 4: Local anaesthesia.

Figure 5: Incision and flap elevation.

Figure 6: Placement of four implants.

Figure 7: Nova Bone putty graft loading gun.

Figure 8: Graft material being deposited.

Figure 9: Titanium Reinforced PTFE membrane.

Figure 10: Absorbable sutures placed.

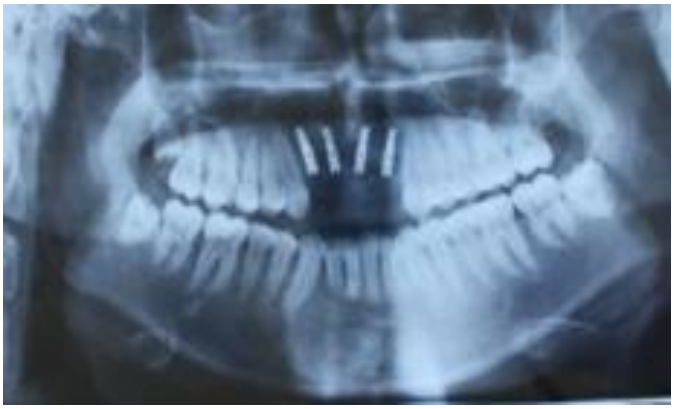

Figure 11: Post operative orthopantomogram.

Figure 12: Review at 14th-day.

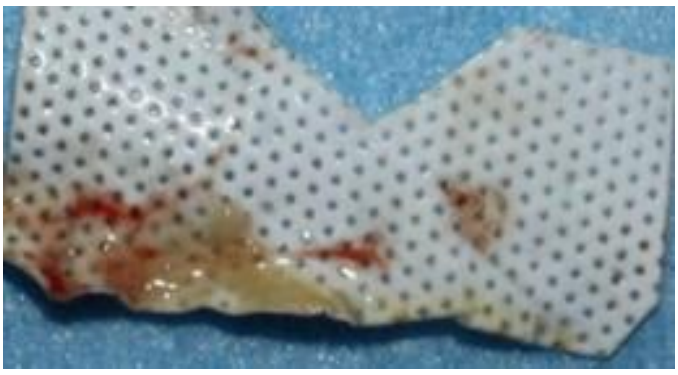

Figure 13: Removal of PTFE membrane.

Figure 14: Review at 21st-day.

Figure 15: Review at 3 months

The prosthetic phase was initiated at the end of 4 months. The cover screws were removed and healing abutments were attached. (Figure 16) The patient was recalled after 2 weeks. The healing abutments were removed followed by the placement of impression copings. (Figure 17) An open tray impression was made. Impression copings were retained in the impression following the removal of the impression. Implantanalogs were attached to the impression copings. A gingival mask was poured around the junction of the impression copings and analogues to create a soft tissue emergence profile. Cast was poured in stone. Impression screws were loosened. The cast showed the implant positions as replicated by the analogues with the gingival mask providing the emergence profile. Abutments were fixed on these analogues and a jig trial was done in the patient's mouth.

The abutments were customized and an abutment-level impression was made. Shade selection was done and the impression was sent to the lab for the fabrication of the

prosthesis (Figure 18 and 19). To mask the remaining defect, gingival porcelain was added. (Figure 20) The crowns were fabricated and cemented using Glass ionomer cement. (Figure21 and 22)

Figure 16: Healing abutments placed.

Figure 17: Impression copings placed.

Figure 18: Customized abutments.

Figure 19: Abutment level impression.

Figure 20: Final prosthesis with gingival porcelain.

Figure 21: Post op intraoral view.

Figure 22: Post op extraoral view.

Discussion

End osseous dental implants are a predictable tooth replacement option that can improve many people's dental health and quality of life. According to numerous studies, dental implants placed in the anterior maxilla have nearly the same success and survival rates as implants placed in other segments of the jaw. However, there is frequently not enough bone to support and receive implants. Trauma, Periodontal disease, endodontic infection, post-extraction ridge ab normalities, etc. can all lead to this. A sufficient amount

of bone density is necessary for successful implant placement at the intended site so that an implant of the right size may be positioned and oriented properly.[4] The treatment duration is shortened without affecting the success rate or raising the risk of failure when grafts are placed concurrently with dental implants.[2] The interaction between the graft and the surrounding host bone is crucial and is the subject of much research. The degree of bone grafting essential for implant placement varies from localized deficiencies to cases where there is a need to change the entire arch form and/or jaw relationship.

A successful bone graft allows the jaw bone to be strong enough to support the dental implants inserted. There are several bone grafting methods like allografts, autografts, synthetic bone grafts, and so on. Among these, synthetic bone grafts have been proven to enable the implant sites to regenerate bone naturally. Allografts, autografts, synthetic bone grafts, and other techniques for bone grafting are available. Synthetic bone grafts are one of these and have been shown to help implant sites Spontaneously grow bone. Nova bone porous granules were employed as the synthetic graft material in this investigation. Crystalline forms of calcium phosphor silicate make up these granules. The granules, which are developed to provide optimal stability at the defect site while facilitating regeneration and regulated material resorption, have a particle size range of up to 1 mm and a 65% porosity with pore diameters of up to 100 microns. The membrane was made of poly tetra fluoroethylene with titanium reinforcements. According to Bembi et al[5], improved healing, a decrease in probing depth, the correction of osseous ab normalities, and superior outcomes on radio graphic evaluation were all demonstrated by the synthetic bone graft known as Nova bone putty. Healing in this instance was judged to be successful, and the bone defect clearly improved. At the end of 4 months, the implants had totally Osseo integrated. After the prosthetic phase was over, the patient was qtepleased with the treatment outcome.

Conclusion

A sound knowledge regarding anatomical. biological, surgical and prosthetic planning and a meticulous execution are essential for the successful restoration of lost teeth in the maxillary anterior region.

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