Treatment of Dehiscence during Implant Placement using Intraoral Ledge Bone Autograft: A Case Report

Abhaya Gupta¹, Vandana A Pant², Mona Sharma³
¹Senior Resident, Department of Periodontology, Faculty of Dental Sciences, King George’s Medical University, Lucknow, Uttar Pradesh, India
²Professor, Department of Periodontology, Babu Banarasi Das College of Dental Sciences, Babu Banarasi Das University, Faizabad Road, Lucknow, Uttar Pradesh, India
³Reader, Department of Periodontology, Babu Banarasi Das College of Dental Sciences, Babu Banarasi Das University, Faizabad Road, Lucknow, Uttar Pradesh, India

Dental implants are established substitutes for replacing missing teeth. For the successful implant placement, the volume of adequate bone at the recipient site is absolutely essential. Peri-implant dehiscence defects are most often encountered at the site of implant placement that requires bone augmentation. These defects may range from very small lack of marginal bone to large areas of denuded implant surfaces. Recent clinical studies have demonstrated that the application of autogenous bone grafts in conjunction with placement of implants leads to successful coverage of the previously exposed implant surfaces. The present case report highlights the bone augmentation of the peri-implant dehiscence defect by intraoral autogenous bone graft while performing the first-stage implant surgery for multiple edentulous areas.

Keywords: Autogenous graft, Bone augmentation, Bony ledge, Osteogenesis, Peri-implant dehiscence

INTRODUCTION

Dental implants are widely accepted as the alternatives for replacing missing teeth. In 1986, Lekholm highlighted the importance of adequate bone volume at the implant site for the successful implant therapy, since the prognosis of dental implants is adversely affected by inadequate bone volume in long term. Largely four methods have been described to promote osteogenesis and augmentation in case of horizontal and vertical defects in both maxilla and mandible. These include osteoinduction, osteoconduction, distraction osteogenesis, and finally guided bone regeneration.

Peri-implant dehiscence defects are most commonly seen at the implant placement sites, ranging from very small defect of marginal bone to large areas of denuded implant surface that require bone augmentation for their correction. Recent clinical studies have demonstrated that application of autogenous bone graft in conjunction with placement of implants in the areas of exposed implant surfaces has led to its successful bone coverage. Autogenous bone graft is regarded as the “gold standard” because of its inherent osteogenic property, and further, it fulfills all three components of the regeneration triad that is cells, scaffold, and signaling molecules.

The present case report highlights augmentation of the peri-implant dehiscence defect by autogenous bone graft, obtained from ledge present in the mandibular molar region, during the placement of implant in the management of multiple missing teeth.

CASE REPORT

A 59-year-old male reported to the OPD of Periodontology with a chief complaint of missing teeth for 1 year which gave poor appearance and hampered his social interactions. Clinical examination revealed missing mandibular right incisors, premolars, and first molar (Figure 1). The patient also had an endosteal implant without any abutment in the mandibular left incisor region of the jaw which he got performed by someone else 1 year back. The treatment plan was discussed with the patient, and two-stage surgical procedure was planned. The patient was evaluated for the available buccolingual width of bone using bone mapping procedure which involved penetrating the buccal and lingual mucosa down to the alveolar bone.
The endosteal implants of dimensions 3 mm × 11 mm (Alpha Biotech, ARRP - Arrow, Screw shaped) in respect to the edentulous region in the incisor region and 3.75 mm × 11 mm and 5 mm × 11 mm (Hitech WTI-105R, Self-thread) in premolar and first molar region, respectively, were placed following the standard surgical procedure. A circumferential peri-implant dehiscence was found mesiobuccal to the implant with respect to 44 exposing two of its threads, which was planned to be augmented with some allogenic bone graft (Figure 2). However, while preparing osteotomy site in the posterior region, a sharp bony ledge was encountered which was flattened by osteoplasty using bone Roengers (Figure 3). The bony ledge chips were collected to be utilized as autogenous graft for augmentation at dehiscence site in the premolar region (Figure 4). The bone chips were slightly crushed into smaller pieces with mortar and pestle and were gently condensed at the defect site with a bone condenser (Figure 5). Blood clot was allowed to be stabilized over the graft to act as scaffold as well as barrier. The mucoperiosteal flaps were adapted and secured with the interrupted sutures. All implants showed satisfactory primary stability, and immediate intraoral periapical radiographs revealed good alignment. Post-operative healing was uneventful and the patient was periodically reviewed with clinical examination and radiographs. After 8 months of healing period, the radiographs showed bone fill (Figure 6).

**DISCUSSION**

The history of modern day periodontal bone grafts dates long back when Naber and O’Leary in 1965 first reported that shavings of cortical bone removed during osteoplasty and ostectomy could be used successfully to bring about a coronal increase in bone height in the intraosseous periodontal defects. The clinical evidence that fine particles of autogenous bone mixed with saliva and blood can induce regeneration of alveolar bone was first documented by Robinson in 1969.
Particulate autograft offers numerous advantages such as smaller particle size facilitate rapid revascularization, larger surface area for osteoconduction, greater exposure for osteoinductive growth factors, and easier bone remodeling compared with a bone block graft. They are indicated for dehiscence or fenestration defects where it is possible to perform a bone augmentation procedure simultaneously with implant placement.\(^1\) Bone chips which were obtained for this case were of particulate nature with above-mentioned advantages.

A study on beagle dogs has demonstrated that augmentation of peri-implant bone defects with autologous bone grafts showed a significantly higher crestal bone level and bone density as compared to the non-filled sites.\(^2\) Johansson et al. prospectively evaluated the prognosis of implants placed simultaneously during maxillary sinus floor augmentation procedure and concluded that locally harvested autogenous bone chips enable successful healing and loading of implants.\(^3\)

Cell viability seems to be significantly affected by the harvesting technique; therefore, sharp instruments have used that result in lesser trauma to the grafted material. Further grafting with particulate bone can also reduce the risk of soft tissue in-growth between the recipient bed and graft.\(^4\)

According to Karl Misch, the blood clot releases growth factors (e.g., platelet-derived growth factor, transforming growth factor) and cytokines (e.g., IL-8) to attract neutrophils and macrophages. The clot is later replaced with granulation tissue which provides pluripotent perivascular cells that can differentiate into osteoblasts and contribute to osteoid formation. Therefore, adequate vascularization is required for maintaining the vitality of the transplanted cells within the graft.\(^5\)

Periodontal diseases in addition to reducing the alveolar bone height also alter the morphologic features of the bone. Bone ledges are nothing but thickened bone plates that have resorbed due to periodontitis to form a flat plateau-like bony margin. The bony ledge, for this case, was well utilized for autogenous graft.

The barrier membranes were not used in this case because the resorbable ones have its inherent disadvantage of collapsing into the defect while the non-resorbable membranes require the second surgical intervention for their removal. Moreover, in the present case, the blood clot formed during bone graft condensation has its crucial role since it alone acted here as a barrier. Further, the use of allografts, alloplasts, and xenografts was avoided over autograft since it being the body’s own tissue is considered as the better alternative.

Till now, as per our literature search, graft from ledge has not been procured. When flap was raised, the bony ledge was a good source for autogenous bone graft. Further study related to the nature of ledge bone can be conducted.

**CONCLUSION**

It is very unfortunate that nowadays, clinicians are more attracted toward the synthetic graft materials without giving a second thought to the autografts which are present in abundance in the patient’s oral cavity itself. It is well known that autogenous bone grafting outshines the other grafts due to several advantages including lesser healing times, good bone quality, less material costs, no immune rejection, no disease transmission risk, and foreseeable repair of larger bone defects. Henceforth, autogenous bone grafts can be best utilized for the augmentation of small peri-implant osseous defects (dehiscence) if the donor sites permit.

**REFERENCES**

