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RESEARCH ARTICLE

HARD AND SOFT TISSUE AUGMENTATION IN THE MAXILLARY ANTERIOR ESTHETIC ZONE FOR IMPLANT THERAPY USING MODIFIED VENEER TECHNIQUE: A CASE REPORT

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ABSTRACT

When it comes to the rehabilitation of a single anterior missing tooth, nature's design is mostly dictated by surgical limitations that make it difficult to construct both functional and aesthetically pleasing implant-supported restorations. Soft and hard tissue augmentations are required for long-term survival and an aesthetic outcome in the anterior region due to volumetric changes of the alveolar ridge and related soft tissue abnormalities that may be detrimental to endosseous implant placement and implant aesthetics. In the following case report, rehabilitation of maxillary anterior edentulous region with Seibert class III bone defect is done using a modified veneer technique.

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INTRODUCTION

The amount of osseous tissue that is accessible for implant insertion directly affects the certainty of implant procedures and long-term stability.[1]Following tooth extraction, bone tissue undergoes atrophy, which worsens the circumstances necessary to achieve a desirable aesthetic outcome by reducing the overall volume of the socket.[2] Alveolar bone resorption occurs in three dimensions and may be attributed to various anatomical or pathologic circumstances.[1] For optimum survival and aesthetic outcomes, soft and hard tissue augmentations are required in the anterior region due to volumetric changes of the alveolar ridge and related soft tissue abnormalities that may be detrimental to endosseous implant placement and implant aesthetics.[1]It has been observed that in order to provide adequate bone height surrounding the implant, thicker bone is required.[3] While a labial side horizontal bone width of more than 2 mm and adequate gingival thickness are thought to be ideal for a prosthesis with good aesthetic results, the volume of the hard and soft tissues is frequently insufficient due to ridge alteration after tooth extraction. A strategy to address this problem is eagerly awaited.[4]

It is advised to preserve the socket and install implants as soon as possible to reduce bone resorption following tooth extraction. There have been several documented techniques for ridge augmentation to make implant insertion easier. A number of procedures have been documented, including guided tissue regeneration, mandibular symphysis grafts, allogeneic demineralized bone powder and hydroxyapatite, and the TIME method (titanium mesh with bone grafts).[5] Opinions diverge as for these surgical technique's effectiveness.[4] In these case report, hard and soft tissue augmentation was done in the maxillary anterior edentulous region using a modified veneer technique.

CASE REPORT

In the following case report, a young patient came to the department of Prosthodontics crown and bridge, with a chief complaint of missing maxillary left front tooth which affected patients smile and therefore wanted replacement of the same. Patient had no relevant medical history.

Dental history revealed that patient had suffered from a motor vehicular accident 8 months back due to which she had Ellis and Davey's class VI fracture in relation to maxillary left canine. It had a very poor endo prognosis, so patient was advised to extract the tooth. On examination the missing maxillary left canine tooth region had a Siebert's class III defect, as there was loss of buccolingual width of the tissues as well as loss of apico coronal height of the tissues. (Fig.1).Tension test resulted in inadequate width of the attached gingiva. Patient was interested in a fixed prosthesis treatment. Since the edentulous maxillary left canine region has Siebert's class III defect it was decided to go ahead with reconstruction of hard tissue using modified veneer graft technique followed by soft tissue augmentation inorder to achieve good esthetic results.

Procedure

- Appropriate periapical radiographs, panoramic radiographs, computed tomographic scans were obtained. Impression of the edentulous area was made, the extent of the bone defect was measured.
- At the first stage surgery, the edentulous maxillary left canine recipient site was exposed, a papillae-sparing incision was made, exposing the buccal alveolar bone 3 to 5 mm apical to the mucogingival junction. The length and height of the recipient site was measured to ascertain the size of graft needed.(Fig.2)
- The donor site that is the right buccal ramus was exposed using full thickness mucoperiosteal incision.(Fig.3)
- Buccal ramus shelf graft of 1mm thickness was harvested using 1.0- to 1.2-mm fissure bur in a straight rotary instrument. (Fig. 4)
- The fixation of the harvested ramal graft to the recipient site was done using 1.5mm diameter titanium alloy fixation screws.(Fig. 5)
- Following which simultaneous implant placement (Osstem 4mm x13mm) was done.(Fig .6)
- Inorder to achieve bone regeneration and good wound healing biooss bone particulate and platelet rich fibrin was added to the recipient site and tension free wound closure was achieved.(Fig.7)
- Patient was asked to report back 6 months post first stage surgery, where a considerable amount of increase in the height and width of the hard tissue was noticed and patient was planned for second stage surgery.(Fig. 8)
- At the second stage surgery, retrieval of the fixation screw was done.(Fig.9)
- As the amount of attached gingiva was inadequate, soft tissue augmentation using a free connective tissue graft from right palatal region was planned.
- First a split thickness incision distant from the crest was made, diverging releasing incisions were made to expose the implant site.
- At the same time the implant stability quotient was tested which showed a value of 89.(Fig.10)
- Free connective tissue graft of dimension 12mm x 7mm was harvested from the right palatal region using a split thickness incision.(Fig.11)
- The soft tissue graft was placed at the recipient site along with healing abutment of diameter 4mm and height of 5mm.
- Both the donor and the recipient site tension free closure was done.
- 2 months post second stage surgery there was a considerable amount of increase in the hard as well as the soft tissue dimensions. The gingival collar height was 3mm.(Fig.12)
- Prosthetic treatment: Cement retained layered Zirconia implant prosthesis was planned.
- Implant level impressions were made using a closed tray technique. Prefabricated angled abutment of 2mm gingival collar height was sent to the lab.
- Shade selection was done using VITA classical shade guide
- Coping trial was done,(Fig 13)
- Final cementation of the implant prosthesis was done using self adhesive resin cement.(Fig .14)

Figure 1. Preoperative view of edentulous maxillary left canine with Siebert's class III defect

Figure 2. Maxillary left canine recipient site

Figure 3. Exposure of the right ramus donor site and graft osteotomy

Figure 4. harvested buccal ramus shelf graft (1mm thickness)

Figure 5. Fixation of the ramus veneer graft with 1.5mm titanium alloy screws

Figure 6. Simultaneous placement of implant (4mmx13mm)

Figure 7. Addition of platelet rich fibrin to the recipient site

Figure 8. 6 months post first stage surgery

Figure 9. Retrievel of the stabilisation screw

Figure 10. ISQ: 89

Figure 11. Free connective tissue grafting done using palatal graft (12mm x7mm)

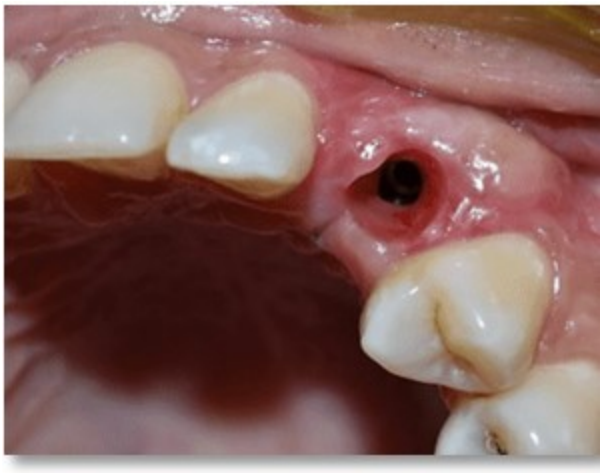

Figure 12. 2 months post surgery

Figure 13. Coping Trial

Figure 14. Cementation of final prosthesis

DISCUSSION

In order to design dental prostheses supported by implants that are both optimally functional and aesthetically pleasing, the implants must be in the proper three-dimensional orientation. To do this, you need a sufficient volume of alveolar bone and a favourable ridge architecture. Autogenous bone grafts remain the gold standard for jaw reconstruction and have been utilised for many years for ridge augmentation.[6] Due to a high failure rate in concurrent implant placement, some studies have suggested delaying implant installation following a transplant.[6] The mandibular ramus partial-thickness bone was thought to be a great donor site in this case report, with concurrent implant implantation. Sufficient primary stability and a feasible dimension for the dental implant were guaranteed due to the graft's capacity to cover the implant surface and the mandibular ramus's dense cortical bone.[6] Tight contact between the implant surface and the graft, as well as a close fit to the implant surface, can offer strong initial stability for concurrent implant implantation. It is possible to shorten the treatment duration overall by using the suggested method.[6]

CONCLUSION

Aesthetics, pleasing phonetics and function were achieved as desired with the modified veneer graft technique and no complications were observed. Bone grafts from the ramus along with soft tissue graft offers a predictable method for reconstruction of ridge deficiencies.

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