Aesthetic enhancement with periodontal plastic procedure in a class 3 alveolar ridge defect

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SUMMARY

Localised alveolar ridge defect refers to volumetric deficit of the limited extent of bone and soft tissue within the alveolar process. Such type of ridge defects can be corrected by surgical ridge augmentation that can be accomplished by the addition of either soft or hard tissues. The contour of a partially edentulous ridge should be thoroughly evaluated before a fixed partial denture is undertaken. The ideal ridge width and height allows placement of a natural appearing pontic which provides maintenance of a plaque-free environment. This article describes a procedure of surgical ridge augmentation of a localised alveolar ridge defect in the maxilla, followed by fixed partial denture, enhancing the aesthetics, function and health.

BACKGROUND

Ridge augmentation is a valuable periodontal plastic procedure in the treatment of ridge defects for aesthetic purposes. The deformities of the dentoalveolar ridge are usually the result of trauma to the alveolar process during extraction. During healing, the soft tissue collapse into the bone defects, creating contours that make it difficult or impossible to make aesthetic functional prosthesis.¹ Various techniques for correcting ridge defects have been described over the years. They are categorised under the soft tissue augmentation procedure and the hard tissue augmentation procedure. The height and width of the residual ridge provide placement of the pontic that appears to emerge from the ridge and mimics the appearance of the neighbouring teeth. Such a residual ridge contour may lead to unaesthetic open gingival surfaces ('black triangle'), food impaction and percolation of saliva during speech.² Siebert³ has classified residual ridge deformities into three categories class 1 defect: faciolingual loss of tissue width with normal ridge height, class 2 defect: loss of ridge height with normal ridge width and class 3 defect: a combination of loss in both the dimensions.

There are high incidences of residual ridge deformity following anterior tooth loss and the majority of these are class 3 defects. This clinical report describes hard-tissue ridge augmentation with coronally positioned flap to correct the alveolar ridge defect combined with fixed prosthodontics to achieve maximum aesthetics and health. This case report describes the use of hydroxyapatite bone graft and guided tissue regeneration (GTR) membrane with coronally positioned flap to correct the buccolingual loss of contour and apicocoronal height. The procedure enhanced the final prosthetic restoration and fixed partial denture, significantly improving the aesthetics.

CASE PRESENTATION

A 42-year-old man visited the department of periodontics for full mouth rehabilitation. There was no relevant medical history of the patient. The dental history revealed that the patient had lost his upper right central and lateral incisor owing to trauma in a road traffic accident 4 years back.

A thorough clinical and radiographical examination revealed a Siebert's class 3 ridge defect in the edentulous region. In the presented case, the loss of faciopalatal ridge width was more pronounced with loss of ridge height (figure 1). Extra-oral examination revealed a bilateral-symmetrical face with a convex profile. Prior to the surgery, the patient was asked to rinse with 0.2% chlorhexidine mouth rinse. After local anaesthesia was achieved, two vertical incisions were made distal to the left central incisor and right canine and a horizontal incision was made on the palatal subcrestal region extending from the mesial side of the maxillary left central incisor to the mesial side of the maxillary right canine. Crevicular incisions were made around the left central and right canine.

A full thickness flap was elevated beyond the mucogingival junction for coronal repositioning of the flap and the ridge defect was exposed (figure 2). The residual defect was visualised and two pin holes were made in the ridge for mechanical retention of the hydroxyapatite bone graft. The graft was mixed with normal saline and it was filled in the defect and covered by a resorbable GTR membrane (figure 3). Now, the full thickness flap was repositioned coronally to cover the filled osseous defect. Suturing was performed with the 4-0 thread (Ethicon, Johnson & Johnson, Baddi, Himachal Pradesh, India; figure 4).

The patient was instructed not to brush over the surgical area until instructed. He was given a prescription of antibiotics and analgesics for 7 days and advised to rinse with 0.2% chlorhexidine for 2 weeks.

Figure 1 Preoperative ridge defect.

To cite: Rastogi PK. *BMJ Case Reports* Published online: 24 December 2012
doi:10.1136/bcr-2012-007129

Figure 2 Flap raised.

The sutures were removed after 2 weeks, and the patient presented with good soft tissue healing. The patient was now given an interim restoration in order to create anatomy of interdental papillae.

Postoperative evaluation after 3 months revealed significant increase in both the width and height of ridge defect (figure 5). Now, final fixed prosthesis was provided to the patient (figure 6).

OUTCOME AND FOLLOW-UP

The patient was pleased with the aesthetic result on 6 month recall appointment (figure 6).

DISCUSSION

Ridge defects create a functional and aesthetic challenge to maintain normal anatomy of the oral tissues. Standard restorative treatment procedures cannot be carried out because tooth-to-gingival relationship is not maintained and there is resultant unattractive restoration.⁴ In this case, interim restoration was given in order to create anatomy of interdental papillae.⁵ No pressure was given in area of surgical site, considering swelling in early face of healing. The location and shape of the interproximal embrasure areas in provisional prosthesis will determine where the 'papillae' are created in the ridge.⁶ In this case, anatomy of interdental papillae can be created by placing ovate pontics with minimal pressure over the augmented ridge.⁵ This eliminates 'black triangle' formation between the teeth and results in excellent emergence profile in fixed prosthesis.⁷

Figure 4 Sutures placed.

The importance of treatment planning and management of the socket before extraction is of utmost importance.⁸ If this step were carried out in every case, we would seldom have to worry about modifications to manage defects that we could have prevented. Unfortunately, these modifications will still occur, but we must realise two fundamental principles: first, there can only be one diagnosis and second, we should apply the procedure to a patient's situation and not apply a patient's situation to a certain procedure. Clinically, what this infers is that if we suspect a ridge defect, we must conduct our diagnostic work-up; if a defect exists, graft it for maximisation of aesthetics, which is a clinical goal.

There are various other prosthetic and surgical options for improving aesthetics in a patient with ridge deformities.⁹⁻¹¹ Long pontic design or gingival (pink) ceramic in the cervical region can enhance aesthetics in such cases. Surgical procedures using soft-tissue autogenous graft, various alloplastic materials, autogenous bone graft and guided tissue regeneration can correct such types of ridge defects.

In the presented case, there was loss of both width and height of the ridge; hence, an alloplast with GTR and coronally positioned flap was used to augment the ridge defect. Examination of the patient on 6-month recall appointment showed clinical success of the procedure performed, restoring aesthetics, function and health of the patient.

The type and amount of destruction of the alveolar ridge play a role in selecting the pontic to be used and also indicate the

Figure 3 Graft and membrane placed.

Figure 5 Postoperative 3 months.

Figure 6 Postoperative 6 months.

necessity for reshaping the ridge surgically. Such alveolar ridge deformities can be corrected by periodontal plastic procedure with fixed prosthodontics, achieving maximum aesthetics and health outcome.

Learning points

- Ridge augmentation is a valuable periodontal plastic procedure in the treatment of ridge defects for aesthetic purposes.
- Periodontal plastic surgery procedures have allowed the reconstruction of hard and soft tissues of the alveolar ridge for functional and improved aesthetic prosthesis.
- Alveolar ridge deformities can be corrected by periodontal plastic procedures with fixed prosthesis, achieving maximum aesthetics and health outcome.
- Long pontic design or gingival (pink) ceramic in the cervical region can enhance aesthetics in class 3 ridge defect cases.
- Anatomy of interdental papillae can be created by placing ovate pontics with minimal pressure over the augmented ridge.

Competing interests None.

Patient consent Obtained.

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