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Ridge reduction- A requisite for retention

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Abstract
Edentulous alveolar ridge is a vital structure regardless of tooth presence or absence. Anatomic changes will invariably take place affecting dimensions of edentulous ridge following dental extractions. Ridge augmentation is the norm, but in this case report ridge reduction was performed due to excess vertical height of the ridge. A 21year old male, presented with missing maxillary central and lateral incisors due to trauma. The aim was to restore the missing teeth with a fixed partial denture, as the patient was unwilling for the implant procedure.On clinical examination, there was increased vertical dimension at occlusion (VDO) for the placement of prosthesis. Therefore, after full thickness flap elevation, about 4mm of buccal and lingual cortical plate was excised using piezosurgery preserving the vital structure at the surgical site. Primary closure of the flap was attained with 3-0 silk sutures.

Keywords: pre-prosthetic surgery, piezocision, vertical dimension at occlusion

Introduction

Anatomically, the edentulous alveolar ridge undergoes changes following dental extractions. Success in restoration of the edentulous area partly relies on the dimensions of the remaining edentulous tissues. Esthetic reconstruction of ridge deformities, continues to arouse a challenge to a periodontist. Before the denture construction, the oral tissues can be significantly enhanced surgically. Primarily, pre-prosthetic surgery eliminates the pathology associated with the denture bearing tissues leading to resultant ridge improvement. There are not many reported instances wherein excess of the ridge has been treated. In this case ridge resection was performed to enable good prosthetic outcomes.

Case Report

A 21year old patient reported to the outpatient department met with a trauma 2months back. Intraoral examination revealed the presence of root stumps irt 11, 21 and missing teeth irt 12, 22. The patient was advised to extract the affected teeth and get replacement of the missing teeth. The aim was to restore the partially edentulous area with a fixed partial denture as the patient was unwilling for the implant surgery.

Upon clinical examination, there was increased vertical dimension at occlusion (VDO) impeding the prosthesis placement (figure 1, 2). Firstly, intentional RCT was performed on 13, 23 followed by a surgery to reduce the vertical height of the anterior maxillary alveolar ridge. After anesthetizing the surgical area, a full-thickness mucoperiosteal access was gained with a crestal incision extending from the mesial aspect of the right maxillary canine to the mesial aspect of left maxillary canine (figure 3). About 4mm of the cortical bone was excised meticulously both buccally and palatally (figure 4, 5). The primary closure of the flap was attained with interrupted 3-0 silk sutures (figure 6).

Uneventful healing was achieved followed by suture removal at one week and fabrication of the prosthesis at 5 weeks post-surgery (figure 7, 8, 9). Alveolectomy procedures can be performed traditionally with bone rongeurs but the use of piezocision in this case can be justified as there was a greater length of edentulous hard tissue in the incisor region to be excised. Piezosurgery has an added advantage of effective cutting in a shorter time with better healing post operatively

Discussion

Preprosthetic surgery is essentially the surgical preparation of either a fully edentulous or partially edentulous mouth before construction of dentures [1]. It is important that the bone is shaped properly as the denture rests on it.

The relation between the alveolar ridges occur with the loss of teeth that may further complicate the fabrication of prosthesis. Hence, the interarch space along with the anteroposterior and transverse relations between the edentulous ridges must be evaluated beforehand to determine the vertical dimension at occlusion. Clinically, lateral cephalometric radiographs can be helpful. This decrease in vertical dimension may be due to supraeruption of the teeth or the segments into the opposing edentulous arch eventually hindering the prosthesis placement.

Smoothing and reshaping with excess removal of the bone, in combination with excision of the excessive soft tissue are few of the measures in need for preparing the mouth for a denture [2]. The placement of an incision on the crest of the ridge and elevating the muco-periosteum as minimally as possible to maintain the vital anatomical structures in the vicinity of the surgical site was carried out using a peizosurgical unit. Alveolectomy is defined as "removal of a part of the alveolus by surgery". In 1976, this procedure was phrased as" heroic treatment of alvelectomy" in which large portions of alveolus were removed with cutting forceps.

In 1905, a surgeon advocated and elaborated on alveolectomy to eradicate gingival and alveolar pathosis and to serve as a foundation for the prosthodontist to prepare a denture. Piezoelectric technique was introduced in oral surgery during the 1970.In bone microsurgery, there are two fundamental concepts governing the idea in the development of piezoelectric bone surgery. First being, the technique is less invasive in which the postoperative pain and swelling is much lower as compared to traditional techniques because of improved tissue healing, ultimately reducing patient discomfort.

The second concept lies in its surgical predictability which increases the treatment effectiveness [3]. Piezosurgery allows atraumatic selective cutting of bone. The high frequency microvibrations of the instrument tips (60-200mm/sec) can cut the rigid bone easily whereas the mucosa and the nerves remain unharmed even in direct contact with the piezosurgery instrument. This technique offers a wide range of applications.

Piezosurgery is one of the highly effective tools used in clinical practice. The reason behind its use is that this instrument possess a variable frequency and power [4]. Piezosurgery is accompanied by minimal intra-operative bleeding. Because the method does not traumatize bone thermally, post-surgical wound healing is rapid. Some researchers [5] compared the efficacy of piezosurgery and conventional rotatory instruments. From their studies it was concluded that the piezo group showed a reduction in postoperative pain, facial swelling, trismus and lesser operative time thereby the need for suturing the minimally invasive incision is reduced.

In addition, piezosurgery has other advantages. The samples harvested using this technique were characterized by integrity of the bone structure but evidence of bone heat necrosis was observed [6]. The efficiency in the early stage of healing is due to the increased Bone Morphogenic Proteins(BMPs) controlling the inflammatory process better and stimulating bone remodeling as early as 56 days after treatment. The limitations include slightly longer osteotomy time and increased heat transmitted by increased working pressure that can lead to tissue damage unless used carefully [7]. Post-insertion problems such as pain, discomfort were not observed in this case.

Thus, this preprosthetic surgery serves as an auxiliary technique in developing a better denture foundation that would enable the fabrication of a comfortable and well-fitting prosthesis.

Conclusion

Ridge augmentation is a norm but in this case ridge resection was performed as the vertical excess was impeding the prosthetic rehabilitation. Owing to its use of minimally invasive surgery, this technique can be considered as an alternative by reducing patient's discomfort, surgical time and hastening the processs of healing. Hence, this procedure should be considered as one of the pre-prosthetic procedures for improving the denture bearing hard and soft tissues.

Figures

Fig 1: intraoral picture showing increased VDO

Fig 2: profile view

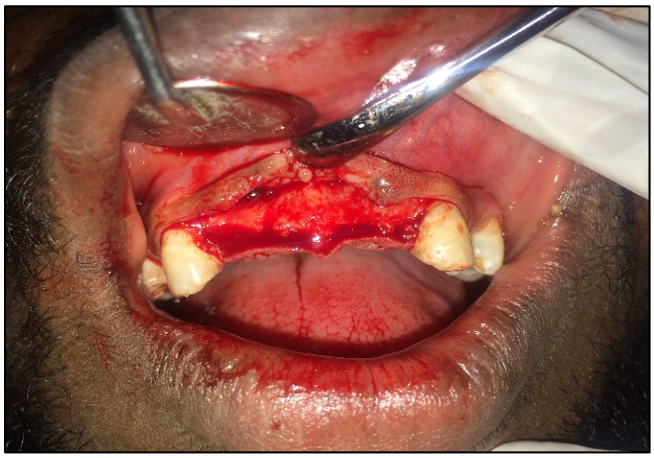

Fig 3: crestal incision over the edentulous ridge with flap reflection

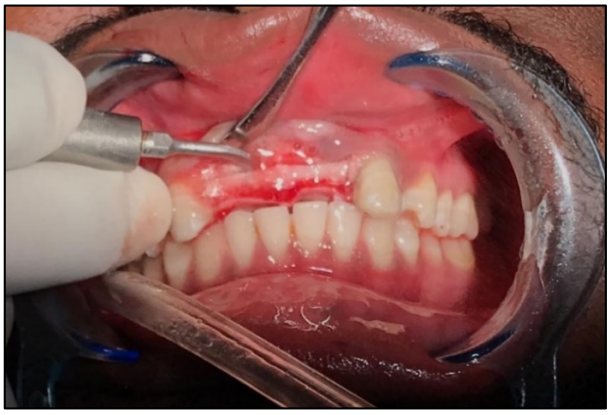

Fig 4: excision of bone using piezounit

Fig 5: closure with continuous 3-0 silk sutures

Fig 6: suture removal after 7days

Fig 7: Permanent cementation after 5 weeks

Fig 8: 4 months follow up

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