INTRODUCTION

Preprosthetic surgery is a surgical procedure designed to facilitate fabrication of a prosthesis to improve the prognosis of prosthodontic treatment. In 1967 the principles of Preprosthetic reconstructive surgery were first introduced by MacIntosh and Obwegeser. Every dental surgeon should have a thorough knowledge of the conditions which favour success in denture construction, for carefully planned and executed surgery can prevent the occurrence of many undesirable features and can eliminate others, either at the time teeth are extracted or later.3,4

Patient Evaluation

Before any surgical or prosthetic treatment a thorough evaluation outlining the problems to be solved and a detailed treatment plan should be developed for each patient.1

Initial preoperative examination:

Patient’s past medical history and current medical status must be reviewed with particular attention to allergies, drug idiosyncrasies, and medications. Haemorrhages tendencies or systemic disorders which would complicate anaesthetics procedures, increase surgical risk etc.1

Secondary preoperative examination: patients frequently have oral tissues which have been abused and distorted by their existing malfitting prosthesis.1

Evaluation of supporting bony tissues: includes visual inspection, palpation, radiographic examination and cases evaluation of models. The remaining mandibular ridge should be evaluated visually overall ridge form and contour, gross ridge irregularities, tori and buccal exostosis Cephalometric radiographs may also be helpful in evaluating the cross sectional configuration of the anterior mandibular ridge area and ridge relationship.1

Surgical procedures for removable prosthesis:

A. Bony recontouring procedures

Simple Alveoloplasty Associated With Removal of Multiple Teeth

Alveoplasty is contouring of the alveolar ridge to remove any irregularities and undercuts. The goals are to provide a stable base for the prosthesis and...
preserve as much alveolar bone as possible. Always be conservative when removing the bone.¹

**Fig.1: Simple Alveoloplasty**

**Intraseptal Alveoloplasty** - An alternative to the removal of alveolar ridge irregularities by simple alveoloplasty technique is the use of an intraseptal alveoloplasty, or *dean’s technique*, involving removal of intraseptal bone and the repositioning of the labial cortical bone, rather than removal of excessive or irregular areas of the labial cortex.²

**Fig. 2: Intraseptal Alveoloplasty**

**Maxillary Tuberosity Reduction**: The maxillary tuberosities are found to be abnormally large in a considerable number of edentulous patients and in the vast majority of cases this enlargement is due to an excess of white fibrous tissue.³

**Fig 3: Maxillary Tuberosity Reduction**

**Buccal Exostosis and Excessive Undercuts**: Exostosis generally require removal, small undercut areas are often best treated by being filled with either autogenous or allogenic bone material. such situation might occur in the anterior maxilla or mandible, where removal of the bony buccal protuberance results in narrow crest in the alveolar ridge area and a less desirable area of support for the denture, as well as an area that may resorb more.

**Fig 4: Removal of Buccal Exostosis**

**Lateral Palatal Exostosis**: The lateral aspect of the palatal vault may be somewhat irregular because of the presence of lateral palatal exostosis. This presents problems in denture
construction because of the undercut created by the Exostosis and the narrowing of the palatal vault.

**Mylohyoid Ridge Reduction:**  
For most parts of the denture border, the limits of the functional anatomy are determined by muscles in activity; this activity may be favourable or unfavourable depending on the direction of the muscle fibres relative to the denture base.⁶

**Genial tubercle reduction:**  
As the mandible begins to undergo resorption, the area of attachment of the genioglossus muscle in the anterior portion of the mandible may become increasingly prominent. In some cases the tubercle may actually function as shelf against which the denture can be constructed, but it usually requires reduction to construct the prosthesis properly.¹²³⁴

**Tori Removal:**  
After teeth are lost, tori may complicate or even preclude denture fabrication. Large, lobulated tori with undercuts must be treated, whereas the restoring dentist may deem smaller, smooth, broad-based tori insignificant.⁷

![Fig 5; a, b: Surgical Process of Palatal Torus removal](image)

**B. Mandibular Augmentation**  
**Superior Border Augmentation**  
Superior border augmentation with a bone graft is occasionally indicated when severe resorption of the mandible results in inadequate height and contour potential risk of fracture or when the treatment plan calls for placement of implants in areas of insufficient bone height or width.⁸⁹⁻¹⁰.

![Fig 6: Superior Border Augmentation](image)

**Inferior Border Augmentation**  
Sanders and Cox reported the first clinical use of an inferior border technique for augmentation of the atrophic mandible. This technique is rarely used for augmentation of Mandibular bulk with inferior grafting using iliac crest bone grafts and is secured with rigid fixation.¹⁰.

![Fig 7: Inferior Border Augmentation](image)
Hydroxyapatite Augmentation of the Mandible:
Hydroxyapatite has revived interest in augmentation of resorbed alveolar ridges. Because bony augmentation of alveolar ridges often undergoes resorption in a short period of time, nonresorbable hydroxyapatite holds the promise of avoiding a recurrence resorption.10

Guided Bone Regeneration (Osteopromotion):
A membrane [nonresorbable or resorbable] is used to cover an area where bone graft healing or bone regeneration is desired. The concept of guided regeneration is based on the ability to exclude undesirable cell types, such as epithelial cells or fibroblast from the area where bone healing is taking place.11

Visor Osteotomy:
The goal of visor osteotomy is to increase the height of Mandibular ridge for denture support. It consists of central splitting of the mandible in buccolingual dimension and the superior positioning of the lingual section of the mandible, which is wired in position. Cancellous bone graft material is placed at the outer cortex over the superior labial junction for improving contour.

Modified Visor Osteotomy:
Consists of splitting of mandible buccolingually by vertical osteotomy only in the posterior regions and a horizontal osteotomy in the anterior region. Corticocancellous bone grafts particles with hydroxyapatite granules are placed in the gap between the superior and inferior anterior segments. Rest of the graft material can be molded on the buccal aspect of the posterior segments.12

C. Maxillary Augmentation
In certain cases, a severe increase in interarch space, loss of palatal vault, interference from the zygomatic buttress area, and absence of posterior tuberosity notching may prevent construction of proper denture.

Onlay Bone Grafting:
It is indicated primarily when severe resorption of the maxillary alveolus is seen that results in the absence of clinical alveolar ridge and loss of adequate palatal vault form13.

Interpositional Bone Grafts:
Interpositional bone grafting in the maxilla is indicated in the bone-deficient maxilla, where the palatal vault is found to be adequately formed but ridge height is insufficient.

Maxillary Hydroxyapatite Augmentation HA is readily available, eliminates the need for donor-site surgery and is easily placed in an outpatient setting. HA can be used to contour and eliminate minor ridge irregularities and undercut areas in the maxilla.14

D. Alveolar distraction osteogenesis
This process is based on the concept of bone distraction along a vector that is transverse to the long axis of the bone, which results in bone formation. A primary advantage of distraction osteogenesis is that there is no need for additional surgery at the donor site. Another benefit is the coordinated lengthening of the bone and associated soft tissues.13,14

E. Correction of Abnormal Ridge Relationship
In totally edentulous patients, the interarch space and the anteroposterior and transverse relationships of the maxilla and mandible must be evaluated with the patient’s jaw at proper occlusal vertical dimension. In the diagnostic phase may require the construction of bite rims with proper lip support.4

Soft tissue abnormalities and their surgical management:
a. Soft tissue surgery for ridge extension of the mandible
As alveolar ridge resorption takes place, the attachment of mucosa near the denture–bearing area exerts a greater influence on the retention and stability of dentures. Soft tissue surgery performed to improve denture stability may be carried out alone or may be done after bony augmentation.15,16.
1. Transpositional flap vestibuloplasty [lip switch]:
A lingually based flap vestibuloplasty was first described by Kazanjian. These techniques provide adequate results in many cases and generally do not require hospitalization.

2. Vestibule and floor of mouth extension procedure:
This combination procedure effectively eliminates the dislodging forces of the mucosa and muscle attachments and provides a broad base of fixed keratinized tissue on the primary denture–bearing area.

b. Soft Tissue Surgery for Maxillary Ridge Extension
The Submucosal vestibuloplasty as described by Obwegeser may be the procedure of choice for correction of soft tissue attachment on or near the crest of the alveolar ridge on the maxilla. This technique is particularly useful when maxillary alveolar ridge resorption has occurred but the residual bony maxilla is adequate for proper denture support.

Maxillary Vestibuloplasty with Tissue Grafting:
When sufficient labiovestibular mucosa exists and lip shortening would result from the submucosal vestibuloplasty technique, other vestibular extension techniques must be used a modification of Clark’s vestibuloplasty technique using mucosa pedicled from the upper lip and sutured at the depth of the maxillary vestibule after a supraperiosteal dissection can be used.17,18

Surgical procedure in fixed denture prosthesis

1. Gingivectomy and Gingivoplasty
Gingivectomy means excision of the gingiva. Gingivoplasty is a reshaping of the gingiva to create physiologic gingival contours with the sole purpose of recontouring the gingiva in the absence of pockets.19

Techniques to increase attached gingiva:
To simplify and better understand the techniques, the following classifications are presented:

A. Gingival Augmentation Apical to Recession
Root resection: A procedure where one or two roots of a multirooted tooth are amputated, leaving the crown to be supported by the remaining root or roots.
Hemisection: The most common root resection involves the distobuccal root of the maxillary first molar.
B. Gingival Augmentation Coronal to Recession (Root Coverage): Understanding the different stages and condition of gingival recession is necessary for predictable root coverage.19

Immediate Ridge Augmentation:
Performed at the time of tooth extraction
Onlay graft- It is of value and predictable in small areas.
Pouch technique- Garber and Rosenberg (1981) - Used for soft tissue ridge augmentation .Usually for Class I type of defects.

Roll technique:
Used for soft tissue ridge augmentation, Class I defects.

Ridge augmentation: improved technique.

Techniques to remove frenum Frenectomy:
Frenectomy is complete removal of the frenum, including its attachment to underlying bone, and may be required in the correction of an abnormal diastema between maxillary central incisors. Frenotomy is incision of the frenum.19

1. Conventional technique
A narrow elliptical incision around the frenal area down to the periosteum is completed. The fibrous frenum is then sharply dissected from the underlying periosteum and soft tissue, and the margins of the wound are gently undermined and reapproximated
2. Z-plasty:

After excision of the fibrous tissue, two oblique incisions are made in a z fashion, one at each end of the previous area of excision. The two pointed flaps are then gently undermined and rotated to close the initial vertical incision horizontally. The two small oblique extensions also require closure.

Subantral Option 3: Sinus graft with delayed endosteal implant placement -Atleast 5 mm of vertical bone is present between antral floor and crest of residual ridge.

Subantral Option 4: Sinus graft and extended delay of endosteal implant placement
Height of bone is < 5 mm between residual crest and sinus floor.

CONCLUSION
Preprosthetic surgical approach, however, calls for the utmost of surgical and prosthetic preplanning and cooperation, as well as meticulous attention to detail in all phases of treatment. When the principles of case selection and treatment outlined previously are followed, excellent results and patient satisfaction can be expected.

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