

PROSTHODONTIC MANAGEMENT OF FLABBY RIDGE: A REVIEW

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Introduction

According to Glossary of Prosthodontic Terms 9 (GPT)-'Flabby tissue is defined as excessive, movable tissue'¹. Flabby tissue or hypermobile ridge tissue is commonly seen in the anterior part of the edentulous maxillary ridge or overlying an atrophic knife-edge mandibular ridge. A flabby ridge is a superficial area of mobile soft tissue affecting alveolar ridges. It occurs when hyperplastic soft tissue replaces the alveolar bone and is seen particularly in the upper anterior region of long-term denture wearers. The reported prevalence has varied but has been demonstrated in up to 24% of edentulous maxillae and 5% edentulous mandibles. This movable denture bearing tissue results in the loss of peripheral seal when masticatory forces come into play. Forces exerted during impression making can also lead to mobile tissue deformation. This results in loss of retention, stability discomfort, and gross occlusal disharmony of the dentures.

This article reviews the various prosthodontic treatment modalities regarding the flabby tissue condition such as impression techniques and its modifications, implant supported prosthesis, and other prosthetic options.

Materials and Methods

- The Overall literature search was conducted in September 2020.
- The keywords were searched in scientific databases such as The PubMed Central, Wiley online library, and Google Scholar.
- The following keywords were combined: Compromised ridges, abused tissues, impression techniques, flabby tissue.
- A thorough screening of the literature obtained, omitting the duplicates were performed for a total of 60 literature. Only 43 literature were found relevant to the topic of interest
- The search aimed to obtain all clinical studies.
- Furthermore, the references of the selected articles were searched for relevant reliable sources.

Review of Literature

Combination syndrome: The characteristic features that occur when an edentulous maxilla is opposed by natural mandibular anterior teeth and a mandibular bilateral extension-base removable

denture, including loss of bone from the anterior portion of the maxillary ridge, hyperplasia of the tuberosities, papillary hyperplasia of the hard palate's mucosa, supra eruption of the mandibular anterior teeth, and loss of alveolar bone and ridge height beneath the mandibular removable partial denture bases; syn, anterior hyperfunction syndrome^{1,2} – GPT 9

Flabby tissue: excessive, movable tissue GPT-9

This is a mobile or extremely resilient alveolar ridge, which occurs due to the replacement of bone by fibrous tissue. It is commonly seen in the anterior part of the maxilla, especially when there are remaining anterior teeth in the mandible. They provide poor support to the denture. Unstable occlusal forces from the remaining natural teeth can cause excessive load on the residual ridge.

Etiological factors for Flabby Ridges⁽³⁻⁶⁾

Etiological factors include long term denture wear without maintenance, trauma from denture base, ill-fitting dentures, malocclusion, poor systemic health, unplanned extractions, ridge resorption, aberrant forces on prosthesis, combination syndrome. Histological examination shows marked fibrosis, inflammation, and resorption of the underlying bone. The inspection may be difficult to find as the color and texture of the tissues are similar to that of normal unless swollen. Proper palpation shows freely movable tissue that is rolled or pendulous. A detailed case history reveals the underlying cause³. The treatment plan should start eliminating the etiological factor.

- Reversal of changes^(6,7)
- Surgical removal of hypertrophied tissues.
- Correction of occlusal disharmony.
- Soft tissue massage.
- withdraw dentures for at least 8 hours a day
- Nutritional supplements.

Management

Flabby tissues are managed by their severity. Different techniques applied for flabby ridge management, include surgical removal and augmentation, special impression techniques, balanced distribution of occlusal loads and implant therapy.⁸

Conservative Approach. (Recovery Program)

1. Tissue rest: The prosthesis should be removed from the mouth for at least 8 hours a day for a few days before starting adequate treatment.

2. Soft tissue massage: To recover the blood supply, patient should massage the soft tissues two or three times a day. Instruct the patient to rinse using mouth wash or even use dissolving one-half teaspoon of table salt in a half glass of warm water.

3. Modification of the denture by flange and occlusal adjustment: Diagnose and remove any pressure areas or sore spots using pressure-indicating paste (PIP). Correction of occlusal disharmonies by clinical remounting and restoring (VDO) the occlusal vertical dimension.

4. Tissue conditioning: Relining the old prosthesis with soft tissue conditioners before fabricating new dentures. The tissue conditioner acts as a cushion, absorbing the occlusal loads, enhancing their distribution to the supporting tissues, and stimulating healing of the inflamed mucosa. It should be changed every 72 hours.

Prosthetic Approach

If the condition persists after conservative management then the prosthetic approach may be employed:

- Impression techniques.
- Centric Occluding record.
- Occlusal form and posterior teeth arrangement

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Impression techniques

If the flabby tissue is compressed during conventional impression making, it will later tend to draw back and dislodge the resulting overlying denture. To obtain optimal support, an impression technique is essential which will compress the non-flabby tissues, and, at the same time, will not displace the flabby tissues. Numerous impression techniques have been suggested in the past decades to help record a suitable impression of a flabby denture-bearing area. When considering these, it is important to realize that all impressions for complete dentures could be categorized in three ways:

1. The mucostatic technique (nondisplacive),⁹
2. The mucocompressive technique (displacive),^{10,11}
3. The selective pressure impression technique — where some denture-bearing tissues are displaced and others are not.¹²

Currently, the reported studies do not clearly support the excellence of either of these techniques over the other. The following techniques have been described to manage flabby tissues.

A. Window technique

The use of a close-fitting tray with a window cut in the tray around the fibrous ridge area. This design enables a close-fitting impression to be taken of the firm areas of the mouth, whilst impression plaster can be used to record the fibrous part. An impression is taken in impression paste (mucodisplacive). Once this has been set it is left in place and impression plaster (or any light body impression material - mucostatic) is painted over the flabby ridge.

B. One-part impression technique (Selective perforation tray)¹³

A spaced special tray is prepared for use with a low viscosity impression material, such as impression

plaster, low-viscosity silicone or alginate. Pressure on the unsupported, displaceable soft tissue can be minimized further by the use of holes in the tray overlying these areas.

C. Controlled lateral pressure technique

This technique was recommended by several authors for use with a fibrous (unemployed) posterior mandibular ridge¹⁴⁻¹⁶. They explain a technique in which tracing compound (green stick) is used to record the denture bearing area using a correctly extended special tray. A heated instrument is then used to separate the greenstick associated with the fibrous crestal tissues and also the tray is perforated in this region. Light body silicone impression material is then syringed onto the buccal and lingual aspects of the greenstick and the impression inserted. The excess material is squeezed out through the holes and theoretically the fibrous ridge will assume a resting central position having been subjected to even lateral pressures.

D. Palatal splinting using a two-part tray system

In 1964, Osborne described this procedure involving two overlying impression trays used for recording maxillary arches with displaceable anterior ridges¹⁷. A primary model is made using the fitting surface contour of a previous denture. From this a palatal tray is fabricated with wax being employed to make space on the palatal aspect of the mobile area and lengthening to the ridge crest on all sides of the arch. In this palatal tray, a low viscosity zinc oxide paste impression is taken of the palate. An upward force is sustained until it is apparent that the mobile ridge is just beginning to have pressure applied to it. Once this has set, a second special tray impression is taken completely enclosing the first tray. It should be inserted from in front, backwards, and also the presence of the supporting zinc oxide should prevent backward displacement of the mobile ridge.

In 1985, Devlin¹⁸ described an accurate modification of this approach, in which a locating rod is

positioned in the centre of the palatal tray, but proclined to allow the second special tray impression to be guided in an oblique upward and backward direction to envelope the palatal tray. The palatal tray accurately locates the second part special tray employing a stop, thereby providing a pre-planned even thickness of impression material.

E. Selective composition flaming¹³

A 3-4 mm spaced rigid special tray is prepared and went to take a composition impression of the primary cast. 3. The impression periphery is carefully softened and functionally trimmed. The fibrous part of the ridge is outlined on the impression surface. Before the tray is seated under heavy pressure, the composition overlying the firm denture bearing areas is softened with a flame attempting to replicate functional force. By performing the impression through this way, the initial relatively undistorted shape of the fibrous tissues is retained while the tissues more capable of functional denture support are recorded in a displaced state.

F. Two part impression technique¹⁷:

Mucostatic and mucodisplacive combination

This popular technique is first described by Osborne in 1964 for use in the mandible, which ensures pressure exerted by the tray does not cause distortion of the mobile tissues. The displaceable tissue is marked on the impression and transferred to the primary cast. A close-fitting cold-cured or light-cured acrylic base is formed so as that the flabby ridge area is left uncovered. Impression is recorded in zinc oxide-eugenol or medium-bodied silicone. An impression of the displaceable mucosa is then recorded by applying or syringing a thin mixture of impression plaster or light-bodied silicone.

Modification of the special tray after the more viscous impression material has been wont to record the entire of the denture bearing area (including the displaceable area). Within the fibrous ante-

rior maxilla, modification of the handle position is usually required. A rim handle design has the advantage of aiding prevention of unset impression material falling to the rear of the mouth, when the patient is supine. The advantage of a window design implies that the acceptable border correction is undertaken and checked round the entire sulcus before the second stage of the impression is completed.¹⁵

G. Hobkirk technique:¹⁹

In this case report Bansal et al. explained fabrication of new complete dentures using Hobkirk technique. Here, special tray was fabricated using the double spacer over the flabby tissue area and within the region of mid raphe. After conventional border molding, impression was made with medium body elastomeric impression material and impression material was removed within the region of flabby tissue employing a scalpel. Relief holes were made and tray was loaded in this region with the light body elastomeric impression material to record flabby tissue.²⁰

H. Zafarullah Khan technique²¹

In this technique, spacer was adapted over the primary cast except in the region of flabby tissue. Special tray was fabricated providing a window in the region of flabby tissue and impression was made with zinc oxide eugenol impression material. With the zinc oxide eugenol impression (DPI Impression Paste) in the mouth, flabby tissue was painted with impression plaster. Master cast was poured after applying soap solution as separator over impression plaster. The denture was fabricated in which flabby tissue was properly recorded and given adequate relief.²⁰

I. William H Filler²²

He described a method using two trays. The second tray is keyed on the primary tray. Light body material is used within the primary tray as a corrective wash material. Adhesives are painted on the areas not covered by preliminary impression in second

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tray and impression is taken. The two trays are held together until the impression material sets. Impression is removed as one unit.

J. Jone D Walter technique²³:

He recorded the healthy denture bearing tissues with zinc oxide eugenol paste then the undisplaced fibers of tissue with impression plaster.

K. 'Splint Method' By Allan Mack²⁴:

This method is used when tissues are excessively and exceptionally flabby. Prepared a special tray with heavy relief over the flabby area is taken. Plaster is painted over the flabby area to a thickness of about 3 mm and is allowed to set. Tray is crammed with second mixture of plaster and also the impression is formed. The first coating of the flabby areas thus acts as a 'splint'. It gets removed with the second impression.

L. Modified Fluid wax impression²⁵

Trim the tray over the crest of the residual ridge and make a window opening above spatula until a glossy surface is visible. Apply adhesive on the tray around the window opening and permit it to dry. Place the impression tray on the ridge and inject polyvinyl siloxane impression material over the window opening.

- **Centric Occluding record.**

The jaw relation is recorded using the check bite technique with the smallest amount possible displacement of the supporting structures. Centric relation should be recorded by applying minimal closing force on the tissue, so it should use wax wafer method with easily displaceable recording material as softened wax and silicon or plaster.

- **Occlusal form and posterior teeth arrangement**

Posterior teeth are arranged in respect to neutral zone. Reduce bucco-lingual width of the teeth to decrease the pressure on the tissues. After denture insertion the patient is instructed for periodic

check-ups.²⁶ Anterior maxillary artificial teeth are arranged slightly more to labial, while anterior mandibular artificial teeth are arranged slightly more to lingual without occlusal contact. Lingualized occlusal scheme will be used for posterior artificial teeth arrangement, where anatomic artificial teeth will be used for maxilla and nonanatomic artificial teeth for mandible. Lingualized occlusion is an effort to keep up the esthetics with advantages of the anatomic form while maintaining the mechanical freedom of nonanatomic form.²⁷

❖ Surgical Approach

Surgical removal of the fibrous tissue

The advantage of this approach is that a firm denture-bearing area is produced, which reinforces the stability of the prosthesis. Removal is contraindicated in circumstances where little or no alveolar bone remains.²⁷ The removed tissue often requires prosthetic replacement by denture base material; this could increase the thickness and weight of the prosthesis. Retention is additionally adversely affected by the significant loss of the sulcus depth which is very important in aiding border seal.²⁸⁻³⁰ For conventional prosthodontics, it's argued that although the flabby ridge may provide substandard retention for the denture base, it may be more desirable than no ridge at all^{28,30}.

❖ IMPLANT RETAINED PROSTHESIS

a) Fixed prosthesis

b) Implant retained overdenture.

Fixed and removable implant retained prostheses offer potential benefits to several of the issues encountered with conventional prosthodontics. Implants within the maxilla, which has a higher prevalence of flabby ridge, aren't as successful as within the mandible. The success rates for maxillary implants have been shown to be as low as 78.7%.³¹ It is thought that this could be due to the placement of shorter implants into highly vascular, poor volume, low-density bone.³² In terms of

both time and finance, the initial cost and long-term maintenance costs of these restorations can be high.³³ Other factors that must be considered include: surgery, discomfort and inconvenience, general health of the patient and risk of surgical complications or implant failure.

Discussion

Various impression techniques are suggested in the literature for recording flabby ridges with the minimum amount of tissue displacement²⁰ which comprise of, muco-compressive (displacive, entire denture bearing tissues are displaced), muco-static (non-displacive, denture bearing tissues aren't displaced) and selective pressure impression (denture bearing tissues are selectively displaced)^{3,11,12}. Controversy regarding the most suitable impression technique for flabby ridges is still existed today³⁴, and recording tissues at rest is repeatedly found within the literature and has attained acceptance by many dentists.³⁴⁻³⁹ When taking advantage of this idea (mucostatic impression technique), double spacers, multiple relief holes, or a window tray technique has been used where the flabby tissue is found. Magnusson et al., suggested an impression technique using two different impression materials in a custom tray. Materials preferred impression plaster on the flabby ridge and zinc oxide and eugenol over healthy tissues⁴⁰. A similar technique was also explained by Liddlelow (Bansal et al., 2014).

In 1964, Osborne conducted a study in which two different impression materials using two separate custom trays. Furthermore, a method using impression compound in a custom tray followed by a wash impression using zinc-oxide-eugenol was described by Watt and McGregor⁴¹. They stated it would reduce the movement of the denture base under occlusal loads. This technique was recently reevaluated with the utilization of polyvinylsiloxane (PVS) impression materials by Lynch and Allen⁴² (2003). Earlier, a window impression technique was proposed by Watson, to reduce the movement

of the flabby ridge during the function. They prepared a window within the custom tray over the flabby tissues anteriorly and used the impression plaster for the flabby ridge and zinc-oxide eugenol impression paste for the healthy denture bearing area⁴³. However, the disadvantage of the window technique is the failure to control and uniform application of impression material.

Conclusion

This review explains the impression techniques and other treatment options that can be used to optimize the treatment of edentulous patients with 'flabby' alveolar ridges. When considering conventional prosthodontics, there is a multitude of impression techniques available to deal with the issues caused by the unsupported tissue during denture construction, however, currently, there's a lack of scientific evidence for support of any technique over another.

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