

Stock Tray Modification for Two-Stage Impression Technique for Recording Flabby Ridges: Report of a Case Series

Abstract

Flabby ridges create a prosthodontic challenge in attempts to attain stable and retentive dental prostheses. A displaceable flabby ridge becomes distorted during the taking of a conventional impression. The purpose of this paper is to report a case series involving a two-stage impression technique with window preparation in stock trays and subsequent custom trays to record flabby ridges and displaceable areas. The impression technique modification reported here enabled us to make minimal-pressure impressions of flabby ridges at both the preliminary and the final impression stages. The resulting complete-denture prosthesis exhibited comfortable wear and function, with optimal passive and functional fit.

Key Words

Denture foundation; fibrous replacement; minimal-pressure Impression; redundant ridge; window technique

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INTRODUCTION

Residual ridge atrophy is a wasting process in response to a change in applied forces. There is accompanying bone remodeling with changes in inner architecture and external configuration.^[1-3] This may lead to a clinical situation where the masticatory mucosa is more than 2 mm thick and is displaced by more than 2 mm under light pressure. Such a ridge with excessive mobility is termed a 'flabby' ridge.^[1] A radiographic examination of flabby ridge areas may reveal denuded bone support, indicating bone resorption. Histological and histochemical studies have demonstrated discernible fibrosis with inflammatory cell infiltrate and various amounts of metaplastic cartilage and/or bone.^[4,5] The occurrence of flabby ridges in denture-wearing individuals ranges from 5.1% to 29.0%.⁶ Some studies have suggested the length of denture wear and the lack of denture maintenance as being related to a high frequency of flabby ridge occurrence. The etiological factors for the development of flabby ridges may vary, but they are viewed as speculative. Factors along with atrophy

and ridge resorption, which have been implicated for flabby ridge formation, include parafunctional habits intensifying damaging forces on the residual ridge, combination syndrome, and nutritional deficiencies. Ill-fitting removable prostheses have also been implicated as a risk factor for flabby ridges. This is applicable to the anterior maxillary arch region, which has a centripetal pattern of ridge resorption. The anterior maxilla is weak in resisting stress. In a situation of Kennedy's Class I mandible opposing a completely edentulous maxillary arch, the maxillary complete denture is in occlusion with the mandibular distal extension base partial denture. When in occlusion, the mandibular anterior teeth transmit through maxillary denture rotational and compressive forces. When the maxillary denture is not in the mouth, the mandibular anterior teeth may come into direct contact with and negatively affect the maxillary anterior ridge, subsequently causing loss of bony support with fibrous replacement in the affected maxillary anterior ridge's mucosal layer, and a highly displaceable residual ridge may be observed upon clinical examination. However, there

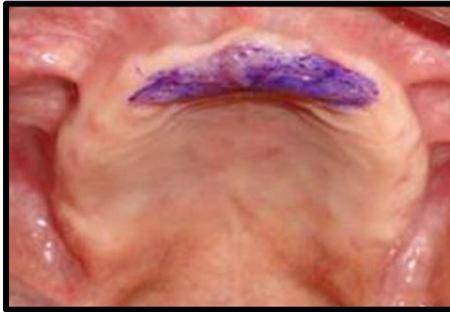


Fig. 1: Location of flabby tissue area marked with indelible pencil in maxillary and mandibular arch

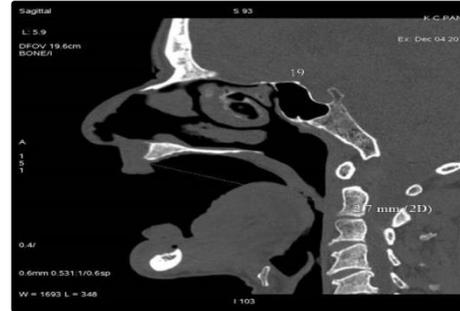


Fig. 2: Dentascans showing high levels of resorption in edentulous mandible, hence ACP PDI Class III



Fig. 3: Modified maxillary and mandibular stock impression trays for primary impression procedure



Fig. 4: Making of primary impression of all denture bearing area except flabby tissue with heavy body addition silicone impression material and then painting the window with light body addition silicone

is a lack of evidence to validate mandibular anterior teeth as causal agents for anterior maxillary ridge resorption. Satisfactory prosthodontic management of a patient with flabby ridges may be achieved by proper recording of affected tissues and by ensuring stable occlusal contacts. A highly displaceable flabby ridge may adversely affect the recording of proper morphological features during impression-making. The displaced soft tissues tend to return to their original form. This visco-elastic predisposition of the affected soft tissues compromises the final fit,

support, retention, stability, comfort, and occlusal harmony of the denture.^[7] The purpose of this case series report is to highlight an attempt made at obtaining undistorted records of flabby residual ridges through modifications made in stock and custom impression trays and with the use of a conventional two-stage impression technique.

CASE REPORTS

Four patients (Table 1) with ill-fitting dentures, and seeking new maxillary and mandibular complete dentures, reported to the Prosthodontics Unit,



Fig. 5: Completed maxillary and mandibular primary impressions



Fig. 6: Construction of special trays with window in flabby tissue regions



Fig. 7: Completed maxillary and mandibular secondary impressions made in light body addition silicone impression material

Faculty of Dental Sciences, Banaras Hindu University, Varanasi, India. All complained chiefly of difficulty in chewing food with their existing dentures.

Case history and clinical examination

Redundant mobile tissue, in either the maxillary or the mandibular arch, was revealed through routine history-taking and during clinical examination of each case. Patients were unaware of their ridge condition (Table 1). An examination of the existing dentures demonstrated unstable maxillary and mandibular dentures with severe attrition of denture teeth. Heavy occlusal contacts were present on functional and non-functional cusps, in centric occlusion.

Treatment plan

The treatment plan was as follows:

1. Evaluation of existing dentures and adjustments made as indicated;
2. Management of flabby ridges by surgical intervention, non-surgical prosthodontic measures, or a combined approach;

3. Fabrication of a new set of maxillary and mandibular complete dentures, with due consideration given to the mucostatic impression technique and stable occlusal contacts.

Denture adjustments and the use of tissue conditioners did not result in the desired improvement of the quality and quantity of the redundant tissues of the flabby ridge areas. Surgical management of these tissues was ruled out by the patient. It was therefore decided to fabricate a new set of maxillary and mandibular complete dentures, with due consideration to the flabby ridge areas.

Step-by-step procedures for a modified two-stage impression technique

- Preliminary impression procedure
 - a) A diagnostic impression of the edentulous arch was made with irreversible hydrocolloid (Zelgan 2002, Dentsply). The displaceable ridge area was demarcated with an indelible pencil; this mark was transferred to the diagnostic impression and subsequently to the diagnostic cast (Fig. 1).

Table 1

Case	A	B	C	D
Age	61 years	58 years	64 years	55 years
Gender	Male	Male	Female	Female
Medical history	Not significant	Angina and hypertension; under medication	Not significant	Not significant
Duration of use of previous dentures	5 years	10 years	2 years	15 years
Edentulous arches	Maxillary and mandibular	Maxillary and mandibular	Maxillary and mandibular	Maxillary and mandibular
Location of flabby tissue area	Maxillary and mandibular anterior region, mandibular right posterior region	Maxillary and mandibular anterior region, mandibular left posterior region	Anterior mandibular region	Anterior maxillary region
Edentulous ridge classification according to ACP PDI [#] classification	Class III	Class III	Class III	Class III

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- b) An appropriate metal stock tray was selected, adapted, and modified for the preliminary cast, ensuring sufficient space for the impression window was formed by means of metal trimming burs (Fig. 3).
 - c) This modified stock tray was tried in the patient's mouth; if required, further modifications were made.
 - d) The tray adhesive (cyanoacrylate) was then applied to the intaglio surface of the modified stock tray.
 - e) Condensation silicone rubber base impression material (putty/heavy-body consistency, Coltène Vivadent) was mixed following the manufacturer's instructions and loaded onto the stock tray, leaving the window area uncovered (Fig. 4).
 - f) The loaded stock tray was then placed in the patient's mouth, and border molding was performed.
 - g) The molded impression material was allowed to set, and the impression was retrieved and inspected. The excess silicone impression material that had flowed into the window area of the stock tray was trimmed by means of silicone burs, and the window was rendered patent.
 - h) The impression was re-seated in the patient's mouth, and accuracy of seating was confirmed. Condensation silicone impression material (light-body consistency) was mixed and gently painted onto the flabby ridge area by means of a painting brush (Fig. 4), without the application of undue pressure.
 - i) The preliminary impression thus obtained was poured into Type II dental stone (Denstone).
- Final impression procedure

- material. The area of the stock tray corresponding to the demarcated flabby ridge area on the diagnostic cast was removed, and a
- a) A custom tray was fabricated by the incorporation of wax spacer and tissue stops in the required areas, with window formation in the flabby ridge area by means of auto-polymerizing pink acrylic resin (DPI) (Fig. 6).
 - b) Custom tray borders were adjusted in the patient's mouth, and border molding was accomplished with medium-body condensation silicone impression material.
 - c) Wax spacer was removed, and the tray was painted with tray adhesive and loaded with light-body condensation silicone impression material. The tray was seated in the patient's mouth, and flabby tissue, accessible through the window, was simultaneously painted with light-body condensation silicone impression material (Fig. 7).
 - d) The impression was poured into dental stone, and a secondary cast was obtained.
 - e) Subsequently, dentures were fabricated by conventional complete-denture fabrication procedures (Fig. 8, Fig. 9, Fig. 10, Fig. 11).

DISCUSSION

Effective management of a patient with flabby ridge areas may include one or a combination of more than one treatment modality, such as surgical removal of flabby tissue, implant-supported prosthesis, and conventional prosthodontic measures without surgical intervention.^[8] Surgical removal of flabby tissue is contraindicated where residual ridge support is meager. The overlying flabby tissue provides a cushioning effect for bone, and its removal may eliminate this effect, and may

also increase the bulk of a subsequently fabricated denture. The implant-supported prosthetic treatment option may be precluded for reasons of time, finance, and feasibility.^[8] Conventional prosthodontic management may circumvent the problems associated with surgical and implant treatment modalities.^[8] A range of impression techniques for recording flabby ridges has been reported in the prosthodontic literature. Of these, the two-stage impression technique has been favored.^[9] In this technique, a mucocompressive preliminary impression is made, followed by a secondary selective pressure impression, to record the entire denture-bearing area except for flabby tissues, which are recorded in accordance with the mucostatic concept. The use of a viscous impression material for preliminary impressions, in a two-stage impression technique, is not risk-free. The subsequently fabricated custom tray incorporates the inaccuracies and distortions inherent in the preliminary impression. Notwithstanding the modifications like windows, etc., made in a custom impression tray, a quantifiable degree of distortion is present in adjacent areas.^[10] In this clinical case series report, the described two-stage impression technique (with window modification in stock as well as custom trays) enabled us to make minimal-pressure impressions of the flabby ridge, at both preliminary and final impression stages. The resultant complete-denture prosthesis exhibited comfortable wear and function, with optimal passive and functional fit.

CONCLUSION

The prosthodontic literature is replete with reports on various impression materials and modified impression techniques to record the flabby ridge at the final impression stage. A not-yet-reported attempt was made at recording the flabby ridge in its undistorted form, by means of a two-stage impression technique, with window modification made in stock and custom trays. It was simple and economical to modify and increase the efficacy of an already-well-established impression technique.

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