

Prosthetic Rehabilitation of Flabby Ridges with Modified Window Impression Technique and Polyvinylsilicone Impression Material

J. Ida Esther Celina, R. Sridharan, C. Preethi, P. Priyadharshini, B. Anbukumaran, S. Sowmiya

Department of Prosthodontics, Chettinad Dental College and Research Institute, Kelambakkam, Tamil Nadu, India.

Abstract

A flabby ridge is a common clinical observation affecting the alveolar ridges of the maxillary or mandibular arches. Among edentulous patients, the anterior region of the maxilla tends to be the most affected area. Dentures placed on flabby ridges often experience compromised stability, support, and retention unless appropriate management strategies are implemented. In conventional impression techniques, compression of the flabby tissues is common, leading to subsequent recoil and potential dislodgment of the overlying denture. The previous research has demonstrated that minimizing the displacement of flabby tissue during impressions can be achieved by regulating the applied forces through factors such as tray design, modification of impression trays, choice of impression material, adoption of the window technique, and control of seating velocity during impression taking. Special impressions frequently employ the window technique for static impressions of flabby areas, posing various challenges. This case report aims to present a modified window technique for the impression of anterior maxillary and mandibular flabby tissues for enhanced and controlled application of polyvinylsiloxane impression material, thus improving the prosthetic outcomes.

Keywords: Flabby ridges, Hypermobile tissues, Modified window impression techniques, Polyvinylsiloxane.

INTRODUCTION

The main objective of complete denture prosthodontics is to restore esthetics, comfort, and function by replacing missing dental and alveolar structures with a stable prosthesis. Ideally, it is preferred to overlay the residual ridge with a thickness of 1.5–2 mm of masticatory mucosa to ensure sufficient soft-tissue support for the denture.^[1] Flabby ridges primarily develop when an edentulous ridge opposes natural teeth and are classified as a feature of the combination syndrome when they occur in the anterior part of the maxilla. In combination syndrome, the presence of flabby ridges in the anterior maxilla is more common. It was believed that the occurrence of the flabby ridge proceeded from a maxillary complete denture opposing mandibular anterior natural teeth, lacking appropriate posterior occlusal support. Flabby tissues may also arise from unplanned or uncontrolled dental extractions.^[2] Flabby ridges are prone to displacement under occlusal forces due to inadequate support, leading to compromised denture retention as a result of the loss of peripheral seal. The retention, support, and stability of complete dentures are compromised by flabby ridges unless the tissue is properly managed and manipulated through specialized impression

techniques. Surgical techniques encompass the excision of excess tissue through scalpel procedures before the fabrication of a complete denture. Nevertheless, excising the flabby tissue surgically increases the bulk of denture material and eliminates stress-absorbing soft tissues, leading to trauma of the underlying tissues.^[3] Moreover, traditional prosthodontic approaches, such as specialized impression techniques and the balancing of occlusal loads, are increasingly utilized in addressing dentures with flabby ridges. Furthermore, Watt and McGregor described a methodology employing an impression compound within a custom tray, followed by a wash impression utilizing zinc oxide-eugenol. They asserted that this approach could minimize the displacement of the denture base under occlusal

Address for correspondence: Dr.J.Ida Esther Celina, Department of Prosthodontics Crown and Bridge and Implantology, Chettinad Dental College and Research Institute, Kelambakkam, Chennai, Tamil Nadu, India.
E-mail: drida.prosthodontist@gmail.com

Received: Jul. 02, 2024; **Accepted:** Jul. 22, 2024; **Published:** Aug 5, 2024

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

How to cite this article: Ida Esther Celina J, Sridharan, Preethi C, Priyadharshini P, Anbukumaran B, Sowmiya S. Prosthetic Rehabilitation of Flabby Ridges with Modified Window Impression Technique and Polyvinylsilicone Impression Material. J Res Adv Dent 2024;15(5):1-4.

Access this article online

Website:
www.jrad.co.in

DOI:

loads. This approach was re-evaluated by Lynch with the utilization of polyvinylsiloxane (PVS) impression materials. Earlier, Watson introduced a window impression technique to reduce the displacement of flabby ridges during function. This involved anteriorly creating a window in the custom tray above the flabby tissues and employing impression plaster for the flabby ridge, along with zinc oxide-eugenol impression paste for the healthy denture-bearing area.^[4] Nonetheless, a potential drawback of the window technique is the challenge of controlling and ensuring uniform application of impression material. This technique paper aims to introduce an adapted window technique for flabby tissues, offering improved control over material application, and utilizing PVS impression material. Two different types of modified window techniques were implemented for the maxilla and mandible.

CASE REPORT

A 70-year-old male reported to the Department of Prosthodontics at Chettinad Dental College and Hospital with a chief complaint of a loose maxillary and mandibular complete denture. During the intraoral examination, edentulous maxillary and mandibular arch with a notably displaceable anterior flabby ridge were noted. The treatment plan involved providing the patient with a new conventional complete denture for the maxilla. A unique window impression technique utilizing PVS material for the final impression was contemplated.

The procedural steps for recording the flabby ridge of the maxillary arch are outlined below

- A primary impression was made using irreversible hydrocolloid impression material with perforated stock trays for the maxillary arch.
- An even layer of baseplate wax was contoured, leaving a 4 mm gap short of the sulcus around the entire denture-bearing area, excluding the PPS region. Tissue stops were integrated bilaterally in the canine and molar regions. An extra layer of baseplate wax was adapted in the flabby tissue area, with four evenly distributed 4 × 4 mm wax extensions.^[5]
- A custom tray was constructed using self-cure denture base resin.
- Border molding was performed utilizing heavy body impression material. Following border molding, the entire wax was excavated, and relief holes were incorporated in the mid-palatal region using a straight fissure bur. The wash impression was made employing monophasic impression material (Aquasil Monophasic Impression Material from Dentsply). Any impression material overextending into the anterior flabby tissue region was excised using a number 11 BP blade. Subsequently, the tray was reinserted into the patient's oral cavity, and the anterior flabby ridge was recorded by injecting light body impression material into the prefabricated slots on the special tray (Figure 1).

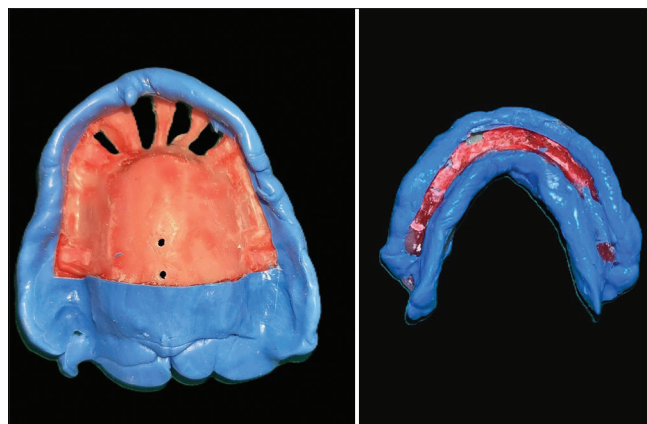


Figure 1: Pre-impression — The border molding for the maxilla and mandible was recorded with heavy body material, the entire wax was removed, and relief holes were created in the mid-palatal region using a straight fissure bur

The procedural steps for recording the flabby ridge of the mandibular arch are outlined below

- A primary impression was made using irreversible hydrocolloid impression material with perforated stock trays for the mandibular arch.
- A cast of the mandibular arch was poured, and the flabby ridge area was delineated. Subsequently, a custom tray was fabricated with tissue stops and two posterior handles.
- The marked area for the anterior window was outlined using a sharp knife before curing the tray material to ease the later removal of the window. A vacuum heat-pressed polyethylene sheet, 0.5 mm thick, was adapted to the tray after curing.
- Subsequently, the window was removed, and three holes of comparable dimensions were created on the polyethylene sheet in the window area.^[6] On trying the tray in the patient's mouth, the flanges were trimmed to be 2 mm shorter than the sulcus depth using a slow-speed motor and carbide acrylic trimming bur.
- Border molding was performed utilizing heavy body impression material. Following border molding, the entire wax was excavated, and relief holes were incorporated using a straight fissure bur (Figure 1).
- The wash impression was made using monophasic impression material (Aquasil Monophasic Impression Material from Dentsply). Any impression material overextending into the anterior flabby tissue region was excised using a number 11 BP blade. Subsequently, the tray was reinserted into the patient's oral cavity, and the anterior flabby ridge was recorded by injecting light body impression material into the holes created on the polyethylene sheet in the window area (Figure 2).
- A master cast was obtained and occlusal rims were made. Jaw relation was recorded and the rims were articulated on a mean value articulator.

NEUTRAL ZONE RECORDED

After mounting the rims in the articulator, the wax was then removed from the mandibular denture base.

- The mandibular record base was positioned in the patient's mouth and assessed for extension and stability by guiding the patient through mandibular movements.
- On stabilizing the mandibular record base, the vertical jaw relation was established with the aid of self-cure acrylic resin vertical stops positioned on both sides of the mandibular canine-premolar region.
- The vertical dimension at rest was assessed using a divider and a 15 cm ruler. The vertical dimension at occlusion was established using self-curing acrylic stops fabricated on the mandibular canine-premolar region.
- The horizontal jaw relation was recorded using an admix material. This material was manipulated in the patient's mouth at approximately 40°C.
- The patient was directed to execute standard mandibular movements, such as swallowing, lip-sucking, and pronouncing vowels, to help shape the neutral zone space. The external surface was entirely contoured by the orofacial musculature (Figure 3).
- The maxillary and mandibular rims were fused at the centric relation. Subsequently, the maxillary and mandibular occlusal rims were mounted on a mean value articulator to create indices around the neutral zone by the putty material.
- The silicone putty index of the neutral zone impression was fabricated. Subsequently, the admix material and self-cure acrylic resin vertical stops were eliminated from the denture base.
- The index was then positioned back on the cast, and wax was poured into the void, providing a precise depiction of the neutral zone.
- The mandibular teeth were set according to the index, and the maxillary teeth were positioned based on the arrangement of the mandibular teeth.
- A wax try-in was done to assess the stability of the mandibular record base, esthetics, and intraoral occlusion. The patient performed all the movements successfully.
- Trial dentures were fabricated using heat-cure acrylic resin. The denture was then polished to maintain the customized contours unchanged (Figure 4).

DISCUSSION

A precise impression of the edentulous ridge and functional sulcus is essential for ensuring a stable and retentive denture. Flabby ridges, when recorded using conventional methods, undergo compression during impression taking.^[7] The elastic rebound of flabby fibrous soft tissue during function leads to instability and the risk of denture displacement and loss of retention.^[8] Numerous impression techniques are suggested in the literature for capturing flabby ridges with minimal tissue displacement mucocompressive (displacive, entire denture-bearing tissues are displaced), mucostatic (non-displacive,

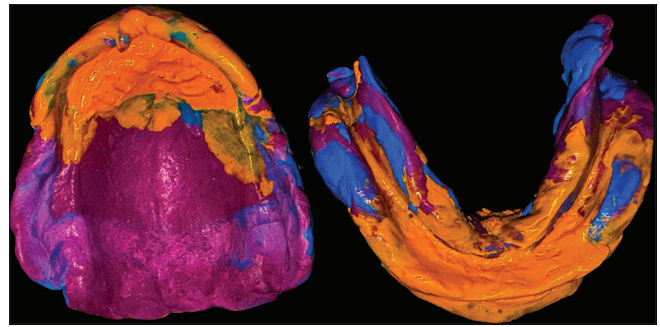


Figure 2: Impression – The wash impression was made using monophase impression material (Aquasil Monophase Impression Material from Dentsply). The tray was reinserted into the patient's oral cavity, and the anterior flabby ridge was recorded by injecting light body impression material into the prefabricated slots on the special tray for both the maxilla and mandible

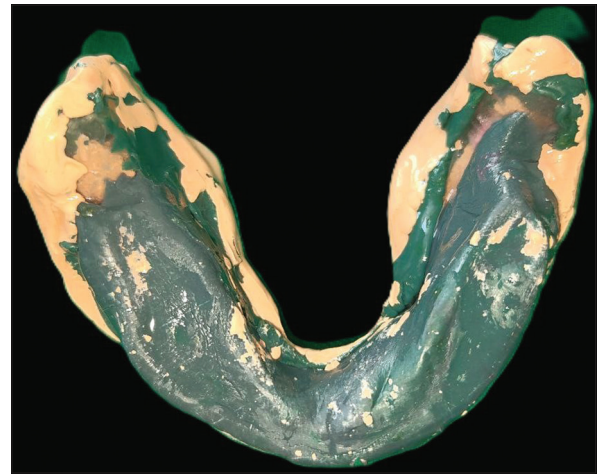


Figure 3: Neutral zone – The neutral zone area is recorded by having the patient perform functional movements, and manipulating the admix material



Figure 4: Post-operative – Complete dentures were successfully delivered to the patient after post-insertion instructions

denture-bearing tissues are not displaced), and selective pressure impression (denture-bearing tissues are selectively displaced).^[9] When applying the mucostatic impression technique concept, double spacers, multiple relief holes, or a window tray technique have been employed at the site of the flabby tissue. Research has shown that impressions taken

with an open window technique result in the least amount of displacement.^[10] Moreover, the choice of impression technique influences the extent of flabby ridge displacement; the two-step impression method causes less tissue displacement compared to the one-step approach.^[11] For the impression of flabby ridges, a window technique involves employing a closely fitting custom tray with a window. In this method, research suggests recording the impression along with the peripheral seal first, followed by preparing the window and recording the displaceable tissues using a low-viscosity impression material, such as impression plaster.^[12] Some propose that for precise peripheral tracing of the functional sulcus and enhanced final impression accuracy, it is advisable to prepare a custom tray with a window before taking the final impression. In this approach, displaceable tissue is then recorded in a static position through the window after the final impression has been taken. Utilizing these methodologies, a mucocompressive impression is obtained for healthy tissues utilizing zinc oxide and eugenol or regular body PVS along with a custom tray. After the impression material has been set, the flabby tissues are coated with a low-viscosity mixture of impression material (impression plaster) through the open window.^[13] A common clinical challenge associated with this technique is the difficulty in achieving uniform application and control of low-viscosity impression material on flabby tissues, primarily due to gravitational forces and variations in dental chair positions, particularly in the maxillary arch. Furthermore, heavy-body PVS is employed to deliver a compressive impression in areas other than the flabby ridge and to ensure stable replacement of the impression during the application of light-body PVS. While PVS offers precision, controlled application remains a concern for the open window technique. The benefit of our approach lies in the elimination of the necessity to create a window in the flabby tissue area. This design is integrated into the fabrication of the special tray itself, thereby reducing clinical work time. The partial window design within this special tray aids in supporting the impression material. Furthermore, the slots located in the anterior region precisely indicate the amount of impression material required for injection, thereby offering better control and enhancing patient comfort. In addition, the modified window technique enables the controlled application of low-viscosity materials, along with minimal pressure exertion on the flabby ridges due to the presence of vents.^[14] Moreover, the transparent polyethylene sheet utilized in this method functions as a stencil, holding and preventing the low-viscosity material from dripping away from the tissue, thereby enabling control and uniform application. In addition, the visibility provided by the clear tray assists clinicians in assessing the adaptation of the impression material to the flabby tissue.^[15] Consequently, the authors advocate for the clinical adoption of this modified

window technique employing PVS impression materials for the final impression of the flabby maxillary ridge in the construction of complete dentures.

CONCLUSION

Clinical results have demonstrated that the modified window impression technique, coupled with PVS material, provides superior adaptation and retention of the final prosthesis. Patients experience improved fit, function, and comfort, leading to higher satisfaction and better overall outcomes. In conclusion, the combination of the modified window impression technique and polyvinylsiloxane material represents an advanced method for the prosthetic rehabilitation of patients with flabby ridges. This approach ensures precise impressions, enhances the stability of the final denture, and significantly improves patient comfort and satisfaction.

REFERENCES

1. Singh RK, Patil N, Datta A, Pattedar A, Billeesh NK. Impression techniques for management of flabby ridges in complete denture patients: A review of literature. *Int J Appl Dent Sci* 2022;8:31-6.
2. Shum MH, Pow EH. Management of excessive movable tissue: A modified impression technique. *J Prosthet Dent* 2014;112:387-9.
3. Bansal R, Garg R, Kaushala S, Kumar M, Saini R. Prosthodontic rehabilitation of patient with flabby ridges with different impression techniques. *Indian J Dent* 2014;5:110-3.
4. Comut A, Andrawis M. Maxillary definitive impression of excessively movable tissue with a single material. *J Prosthet Dent* 2015;114:616-8.
5. Eswaran B, Rohit M, Soniya H. Prosthodontic management of flabby ridge with a modified window impression technique-a case report. *Indian J Forensic Med Toxicol* 2021;15:2328-32.
6. Labban N. Management of the flabby ridge using a modified window technique and polyvinylsiloxane impression material. *Saudi Dent J* 2018;30:89-93.
7. Mostafa AZ, Alanazi SM, Almarshedy SM. Custom double tray for a special impression technique for flabby maxillary residual ridge: Case report. *Clin Case Rep* 2022;10:e05593.
8. Pai UY, Reddy VS, Hosi RN. A single step impression technique of flabby ridges using monophasic polyvinylsiloxane material: A case report. *Case Rep Dent* 2014;2014:104541.
9. Allen P. Management of the flabby ridge in complete denture construction. *Dent Update* 2005;32:524-8.
10. Colvenkar S, Cherukuri VP, Sunitha JD, Ravindra SV, Vanapalli J. Management of flabby edentulous ridge using the window impression technique. *Cureus* 2023;15:e41340.
11. Srivastava S, Mishra S, Chopra D. Modified tray with mesh design for the management of flabby ridge: A case report. *Front Dent* 2019;16:149-52.
12. Bindhoo YA, Thirumurthy VR, Kurien A. Complete mucostatic impression: A new attempt. *J Prosthodont* 2012;21:209-14.
13. Chakarvarty K, Tomar SS, Tandan P, Modi R. Managing flabby tissue with different impression techniques: A case series. *Int J Ophthalmol Clin Res* 2015;3:95-9.
14. Yee A, Meei TI, Ling GC. Managing fibrous maxillary ridge: A case series of impression techniques. *Prim Dent J* 2023;12:51-6.
15. Showkat R, Sharma A, Kumar S, Kaura SM. Management of flabby ridge using Hobkirk's technique: A case report. *Eur J Dent Oral Health* 2020;1:12.

Author Queries???

AQ5: Kindly provide complete history details