

Managing the Unstable Foundation; A Combined Split-Tray and Window Impression Techniques for Management of Maxillary and Mandibular Flabby Ridges: A Case Report

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Abstract

Flabby ridge is a common clinical finding characterized by mobile, displaceable fibrous soft tissue overlying the residual alveolar ridge. Conventional impression procedures may compress these tissues which results in elastic recoil of the underlying tissue and consequent loss of denture support, retention and stability. The management becomes particularly challenging when flabby tissue is present simultaneously in both maxillary and mandibular arches. A completely edentulous patient reported to the department with a need for replacement of the missing maxillary and mandibular teeth. Intraoral examination revealed areas of flabby tissue in the anterior regions of both arches. A nonsurgical prosthodontic approach was selected. Preliminary impressions were made using alginate, followed by fabrication of customized impression trays. For the maxillary arch, a split custom tray was fabricated, with the anterior and posterior components designed to be separated and accurately repositioned using die pins. For the mandibular arch, a custom tray incorporating a window and modified handle was used. Following border molding the stable denture-bearing tissues were recorded with zinc oxide eugenol impression paste, and the flabby tissues were recorded with light-body elastomeric material to minimize tissue displacement. Complete dentures were subsequently fabricated using conventional laboratory and clinical procedures.

Keywords: Flabby ridge; complete denture; split tray; window technique; zinc oxide eugenol; light-body elastomer; selective pressure impression.

Introduction

The primary objective of complete denture prosthodontics is to restore mastication, speech and esthetics while providing adequate support, retention and stability to the prosthesis. Achievement of these objectives depends greatly on accurate recording of the denture-bearing tissues and the functional limits of the denture-bearing area. However, the presence of mobile or displaceable soft tissue overlying the residual ridge creates a significant challenge during impression making. Such tissue is commonly referred to as a flabby ridge. A flabby ridge consists of mobile soft tissue located superficially over the residual alveolar ridge and is generally associated with replacement of underlying alveolar bone by fibrous or hyperplastic connective tissue. It is encountered more frequently in the anterior maxilla, although it can also occur in the mandibular arch. Reported prevalence has been approximately 24% in edentulous maxillae and 5% in edentulous mandibles.¹

The presence of flabby tissue compromises complete denture fabrication because the tissue is easily displaced under impression pressure and occlusal loading. When a conventional mucocompressive impression is made, the mobile tissue may be recorded in a displaced position. Following removal of the impression and subsequently during function, elastic recoil of the tissue can occur. The resulting discrepancy between the recorded and resting tissue position may contribute to denture displacement, loss of peripheral seal and reduced stability. In patients with flabby ridges, the principal objective is generally to record the mobile tissues in a minimally displaced or physiologic state while adequately recording the remaining denture-bearing tissues.²

Several techniques have been developed for this purpose. Watson described the window impression technique, in which a window is prepared in the custom tray over the flabby area. The relatively firm tissues are first recorded, followed by a low-viscosity material being applied to the exposed flabby tissues through the window. More recently, elastomeric materials, particularly polyvinyl siloxane, have been used because they are available in different viscosities and can provide accurate detail with controlled tissue displacement.^{2,3}

Another approach is the dual-tray or split-tray technique, originally described by Osborne in 1964 and subsequently modified by Devlin in 1985. This technique utilizes separate tray components to independently record the normal and mobile portions of the denture-bearing area. The two components can subsequently be accurately related to produce a definitive impression.⁴

The present case report describes the combined use of a split custom-tray technique for the maxillary arch and a window impression technique for the mandibular arch in a completely edentulous patient presenting with anterior flabby tissues in both arches. The technique was designed to minimize displacement of the mobile tissues while maintaining an appropriate record of the remaining denture-bearing structures.

Case Report

A 61 years old male patient reported to the Department of Prosthodontics and Crown & Bridge, Jaipur Dental College, Jaipur, Rajasthan, with the complaint of the missing teeth in both the maxillary and mandibular arches. On clinical examination, the patient had completely edentulous maxillary and mandibular arches. Intraoral examination revealed areas of flabby, mobile soft tissue in the anterior region of both the maxillary and mandibular residual ridges. The presence of mobile tissue was clinically identified by its characteristic displacement under gentle pressure by the blunt end of the mouth mirror. Because conventional impression making could result in displacement of the mobile tissues and

subsequent compromise of denture stability, a modified, nonsurgical impression protocol was planned as the patient declined the surgical excision of the flabby tissue. Complete dentures were planned for both arches, with particular attention given to the definitive impression procedures.

Clinical Procedure

Preliminary impressions of the maxillary and mandibular arches were made using irreversible hydrocolloid (alginate) in a metal stock tray as alginate reduces the risk of excessive distortion of mobile soft tissue during the preliminary stage. The preliminary impressions were removed carefully and evaluated for adequate extension and reproduction of the denture-bearing areas. The preliminary casts were obtained and the areas of flabby tissue were identified. Customized impression trays were fabricated for both arches. Special attention was given to tray design over the flabby areas so that the final impression material would not exert excessive pressure on the mobile tissues.

A split custom tray was designed for the maxillary arch. The tray consisted of anterior and posterior components that could be separated during impression making and subsequently reassembled accurately. The two components were joined using die pins, which served as guiding and positioning elements. This allowed controlled separation of the anterior and posterior components while maintaining their spatial relationship during final impression procedures. For the mandibular arch, a custom tray with a window corresponding to the anterior flabby tissue was fabricated. A modified handle was incorporated into the tray design to facilitate manipulation and positioning of the tray during impression making. The window was designed to permit direct recording of the mobile tissue using a low-viscosity elastomeric material while the remaining denture-bearing tissues were recorded separately.

The custom trays were tried intraorally and evaluated for extension. Border moulding of both maxillary and mandibular trays was performed using green stick low-fusing impression compound. An accurate border moulding is particularly important in patients with flabby ridges because denture stability depends not only on the impression surface but also on appropriate peripheral extension and functional border contours. Previous reports emphasize the importance of obtaining an accurate functional sulcus while recording the flabby tissues with minimal displacement. The maxillary definitive impression was performed using the split custom tray. The definitive impression of the posterior segment of the maxillary arch was made using zinc oxide eugenol (ZOE) impression paste as the posterior denture-bearing tissues were recorded under controlled pressure. Following the setting of the impression materials, the anterior and posterior components were brought together. The die pins facilitated accurate repositioning and stabilization of the two segments. The flabby anterior tissues were recorded using light-body elastomeric impression material. The low viscosity of the light-body material permitted reproduction of the surface details while minimizing the pressure transmitted to the mobile tissue. The completed impression was carefully inspected for complete recording of the denture-bearing area, adequate border extension, appropriate recording of the flabby tissue and accurate approximation of the anterior and posterior segments. The impression of the mandibular arch was made using a window impression technique. The definitive impression was made using zinc oxide eugenol impression paste while avoiding pressure on the anterior flabby area corresponding to the window. The ZOE impression material recorded the relatively firm and stable denture-bearing tissues and the peripheral tissues. After setting of the ZOE impression, the area corresponding to the anterior flabby tissue was exposed through the window in the custom tray. The window permitted direct access to the mobile tissue without the rigid tray exerting direct pressure over the area. The exposed anterior flabby tissue was recorded using light-

body elastomeric impression material. The material was carefully syringed over the flabby tissues through the window, allowing the tissue to remain in a minimally displaced state during polymerization. This approach avoids the conventional compression of the mobile tissues and allows their resting contour to be reproduced. After polymerization of the light-body material, the complete mandibular impression was carefully removed and inspected.

The definitive casts were after beading and boxing of the definitive maxillary and mandibular impressions. Temporary denture bases were fabricated on the maxillary and mandibular master casts. Occlusion rims were subsequently fabricated over the temporary denture bases. Jaw relation was recorded and gothic arch tracing was done. Arrangement of artificial teeth was done on the Hanau articulator. A bilateral balanced occlusal scheme was used to arrange the artificial teeth which an important adjunct to impression management as excessive or poorly directed occlusal forces can destabilize dentures supported by mobile tissues. The maxillary and mandibular waxed-up dentures were tried intraorally. The occlusion was carefully assessed to minimize premature contacts and lateral forces that could contribute to displacement of the dentures. Following satisfactory clinical evaluation of the trial dentures, the dentures were processed according to conventional complete denture laboratory procedures. The processed maxillary and mandibular complete dentures were finished and polished. The completed denture bases were carefully seated intraorally and evaluated for tissue adaptation, border extension, retention, stability and occlusal relationship. Any necessary occlusal adjustments were performed before final delivery.

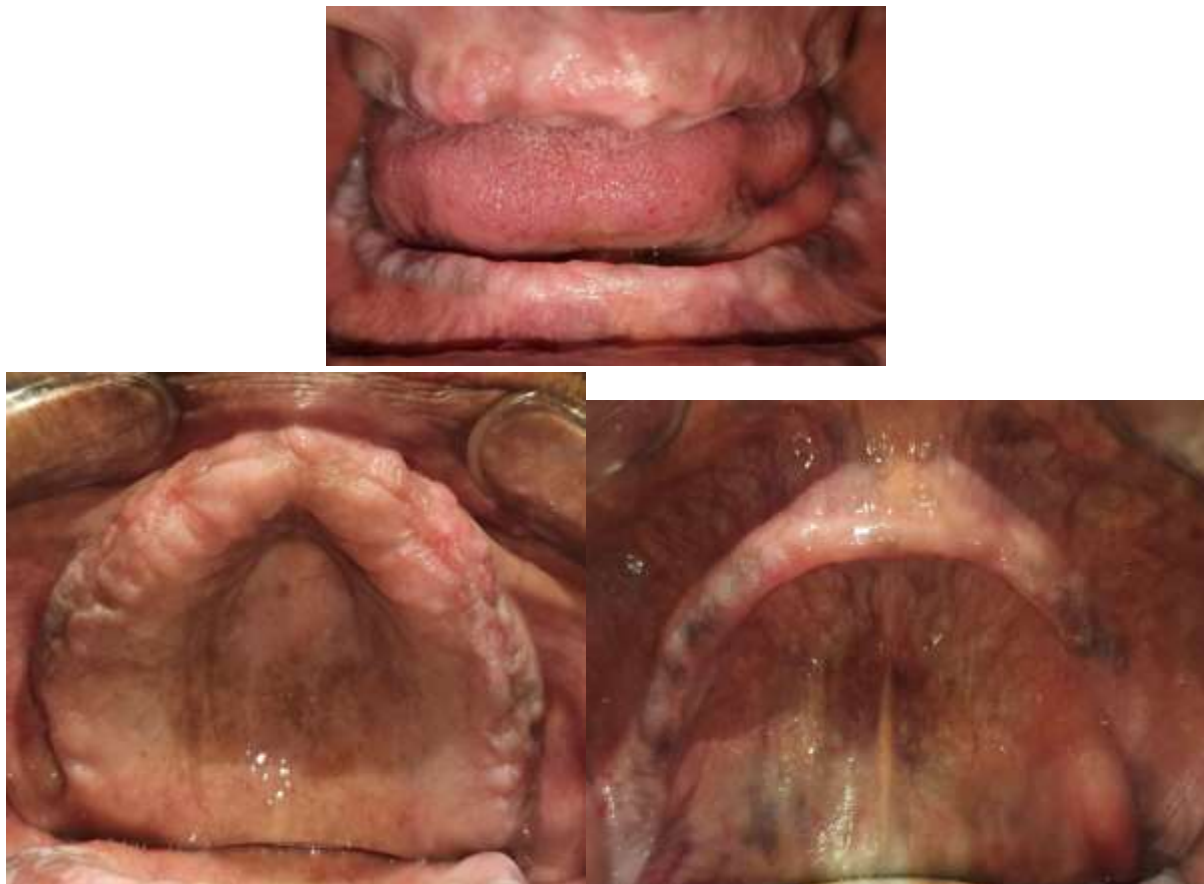


Figure 1. Intraoral view showing completely edentulous maxillary and mandibular arches.



Figure 2. Preliminary maxillary and mandibular impressions.

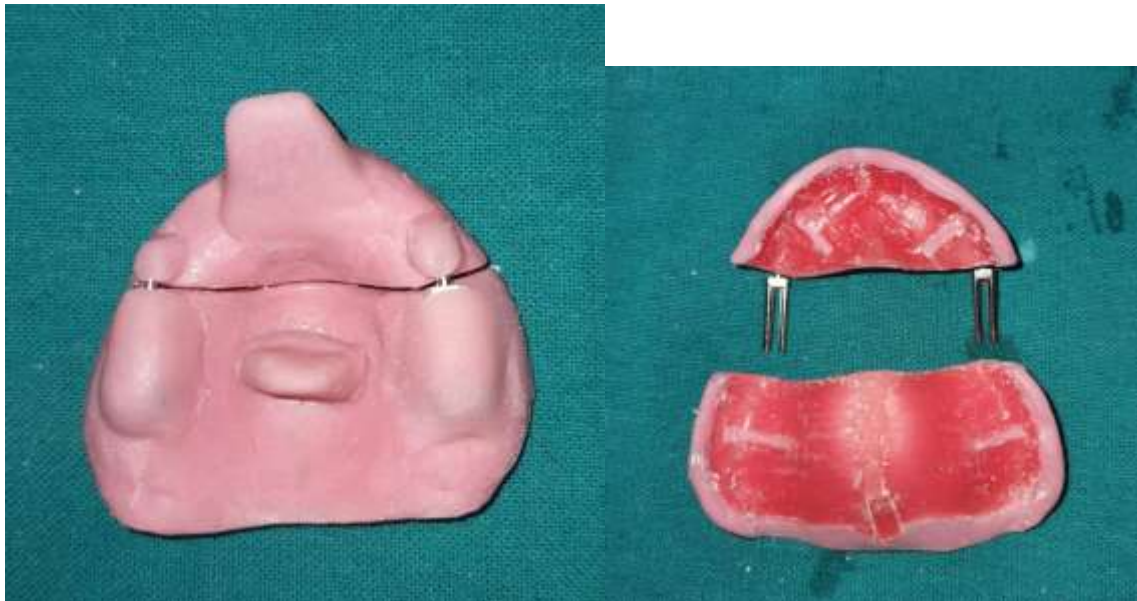


Figure 3. Maxillary split custom tray showing separation of anterior and posterior segments and die-pin arrangement.



Figure 4. Mandibular custom tray.



Figure 5. Border moulding of maxillary and mandibular custom trays using green stick compound.



Figure 6. Mandibular custom tray showing the window and modified handle.

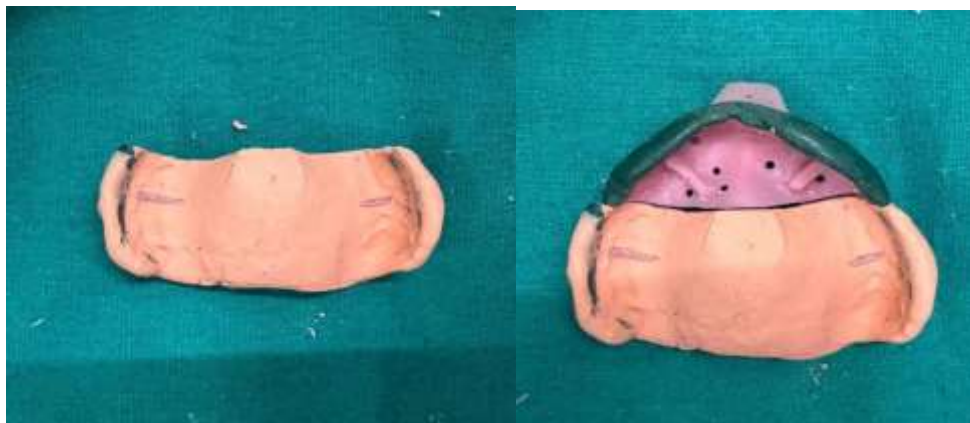


Figure 7. Maxillary posterior impression made with ZOE impression paste.

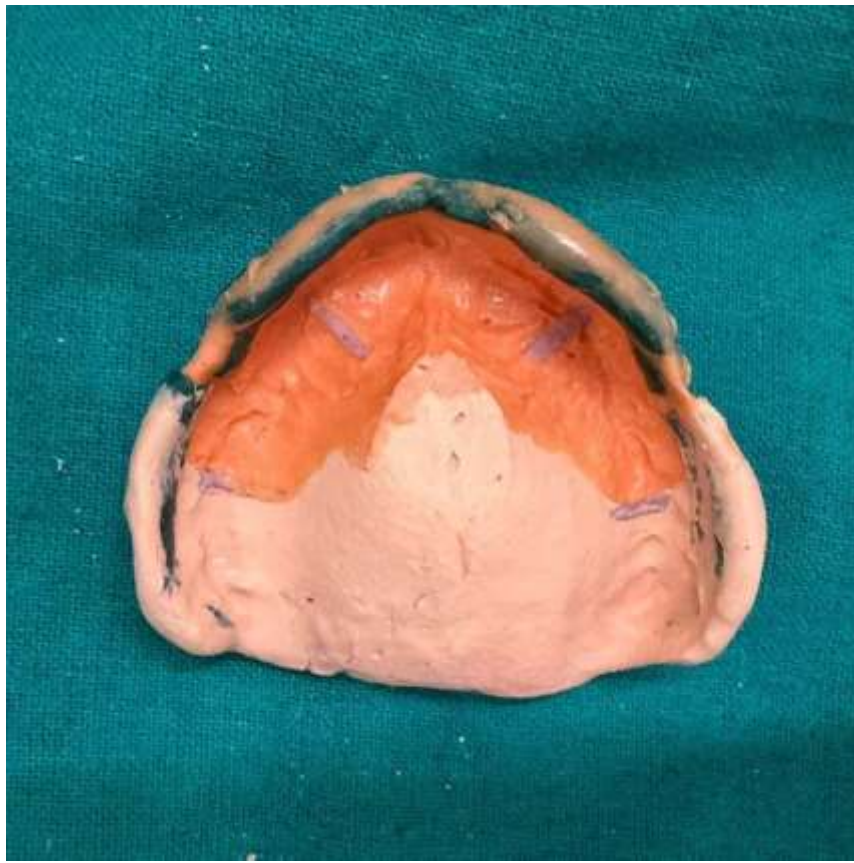


Figure 8. Maxillary anterior flabby tissue recorded using light-body elastomeric impression material after reassembly of maxillary anterior and posterior impression segments using die pins.



Figure 9. Mandibular definitive impression with ZOE impression material.



Figure 10. Recording of mandibular anterior flabby tissue through the window using light-body elastomeric material.



Figure 11. Beaded and boxed impressions.



Figure 12. Jaw-relation record.



Figure 13. Clinical try-in of maxillary and mandibular dentures.



Figure 14. Final inserted maxillary and mandibular complete dentures.



Figure 15. Pre Op Profile Photo.



Figure 16. Post Op Profile Photo.

Discussion

The presence of flabby tissue represents a significant challenge in complete denture treatment because the mobile tissue behaves differently from the relatively firm denture-bearing mucosa. When

compressed during impression making, the tissue may subsequently recoil toward its original position, producing a discrepancy between the impression surface and the tissue in its resting state. This can result in denture movement, reduced retention and compromised stability.

The principal objective in the present case was therefore to record the flabby tissues with minimal displacement while obtaining an appropriate functional record of the remaining denture-bearing tissues. This principle is supported by several published approaches to flabby-ridge management.

Various methods have been described, including surgical excision, ridge augmentation, implant-supported prostheses and modified impression techniques. Although surgical removal may provide a firmer denture-bearing area, excision also removes potentially useful stress-absorbing tissue and may leave an unfavorable residual ridge morphology. Conventional prosthodontic management therefore remains an important conservative alternative.

The maxillary split-tray technique used in this case is based on the dual-tray concept originally described by Osborne and subsequently modified by Devlin. The essential principle is the separation of the mobile tissue-recording component from the component used to record the remaining denture-bearing tissues. The literature describes dual-tray designs as a means of reducing distortion of mobile tissues while maintaining controlled positioning of the tray components. In the present technique, the use of die pins between the anterior and posterior segments provided an additional advantage by permitting separation during impression making and subsequent accurate repositioning. This is particularly useful when different impression materials are selected for tissues with different biomechanical characteristics. The posterior maxillary tissues were recorded using ZOE impression paste, whereas the anterior flabby tissue was recorded with light-body elastomeric material. This combination follows the principle of recording relatively firm tissues with an appropriate definitive impression material while allowing a low-viscosity material to record the mobile tissue with minimal displacement.

The mandibular window technique followed a similar biomechanical principle. The window in the custom tray prevented direct tray pressure over the flabby tissue. The remaining denture-bearing tissues were first recorded with ZOE impression paste, after which light-body elastomeric material was applied through the window to record the flabby area. Window techniques have long been advocated for minimizing displacement of flabby tissue. An important advantage of using light-body elastomeric material is its low viscosity and ability to reproduce fine tissue detail. PVS materials are also available in different viscosities, allowing clinicians to select a material according to whether a relatively compressive or minimally displacing impression is required. The use of a window in the mandibular arch is particularly relevant because the mandible provides less denture-bearing surface area and is inherently more susceptible to displacement of the denture during function. A recent report describing an anterior mandibular modified window technique similarly emphasized the importance of recording stable structures first and subsequently recording the mobile tissues with light-body PVS through the window.

An important feature of the present case is that different impression strategies were selected for the two arches rather than applying a single technique universally. This reflects the principle that management of flabby ridges should be individualized according to tissue characteristics, extent of displacement and clinical anatomy. A recent case series involving patients with flabby tissues in both arches similarly emphasized patient- and tissue-specific selection of impression techniques rather than reliance on a single universally superior method.

Another important consideration is the relationship between impression accuracy and occlusal design. Even when the flabby tissue is accurately recorded, excessive horizontal or eccentric occlusal forces can destabilize the prosthesis. Therefore, careful jaw-relation recording, tooth arrangement and occlusal adjustment were incorporated into the treatment protocol. The present technique therefore represents a conservative, nonsurgical and clinically reproducible approach to a particularly challenging complete denture situation. It combines two established principles—the dual/split-tray technique and the window technique—to address flabby tissues in both arches according to their individual requirements.

The combined approach described in this case offers several potential advantages; minimal displacement of flabby tissues during definitive impression making, separate management of tissues with different biomechanical characteristics, use of light-body elastomeric material for accurate recording of mobile tissue and the technique does not require a fundamentally different denture fabrication workflow after completion of the definitive impressions.

Despite its advantages, the technique is technique-sensitive. Accurate identification of the flabby area and precise fabrication of the tray components are essential. In the split-tray technique, inaccurate repositioning of the tray segments can introduce errors into the definitive cast. Similarly, the window technique requires careful control of the light-body material because uncontrolled application may result in inadequate adaptation or excessive material thickness.

Conclusion

Management of flabby ridges in completely edentulous patients remains a challenging aspect of complete denture prosthodontics. Conventional mucocompressive impressions may displace the mobile tissues and compromise subsequent denture stability because of tissue recoil. The present case demonstrates a conservative approach using a split custom-tray impression technique for the maxillary arch and a window impression technique for the mandibular arch. The maxillary technique allowed the anterior flabby tissue and posterior denture-bearing tissues to be recorded separately and subsequently related using die pins. The mandibular window technique enabled the stable denture-bearing tissues to be recorded with zinc oxide eugenol while allowing the anterior flabby tissue to be recorded with light-body elastomeric material in a minimally displaced state. The combination of these techniques provides a practical approach for the management of bilateral maxillary and mandibular flabby ridges, while maintaining the principles of conventional complete denture fabrication. Careful impression making, accurate jaw-relation records and an appropriate occlusal scheme remain essential for maximizing the clinical performance of the resulting prostheses.

References

1. Labban N. Management of the flabby ridge using a modified window technique and polyvinylsiloxane impression material. Saudi Dent J. 2017;29, <https://doi.org/10.1016/j.sdentj.2017.10.004>
2. Lynch CD, Allen PF. Management of the flabby ridge: using contemporary materials to solve an old problem. Br Dent J. 2006;200(5):258–261. doi:10.1038/sj.bdj.4813306.
3. Chansoria H, Kurhade A, Gupta A, Jayaswal V, Sisodiya M, Gupta S. Mastering the flabby ridge with precision impression techniques in prosthodontics—A case series. J Pharm Bioall Sci. 2025;17(Suppl 4):S3452-S3454. doi:10.4103/jpbs.jpbs_1217_25.

4. Kumarsundar M, Mallikarjuna DM, Mallikarjuna R, Swetha V, Deepthi BC, Pradeep MR. A simplified dual tray impression technique for anterior maxillary flabby ridge – a clinical report. *Sch Acad J Biosci*. 2015;3(2B):202-206. doi:10.36347/sajb.2015.v03i02.015.
5. Singh RK, Patil N, Datta A, Pattedar A, Billesch NK. Impression techniques for management of flabby ridges in complete denture patients: a review of literature. *Int J Appl Dent Sci*. 2022;8(1):31-36. doi:10.22271/oral.2022.v8.i1a.1403.
6. Mostafa AZH, 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. doi:10.1002/ccr3.5593.
7. Maskey B, Kandel K, Regmi M. Prosthodontic management of flabby ridge with modified impression technique: a case report. *J Nepal Prosthodont Soc*. 2024;7(1):57-60.
8. Chiplunkar J, Tumbil M, Chethan MD, Nandeeshwar DB, Patel D. Management of flabby ridge case: an arduous task in undergraduate practice. *Int J Oral Health Sci*. 2018;8:104-108. doi:10.4103/ijohs.ijohs_41_18.
9. Sikri A, Kalra V, Sikri J, Jassal P, Yamika. Precision prosthodontic rehabilitation of flabby ridge with a modified window technique: case report. *Dent J Indira Gandhi Inst Med Sci*. 2024;3:51-64. doi:10.25259/DJIGIMS_1_2024.