

CASE REPORT

Complete denture rehabilitation in a patient with flabby ridge using an open-Window impression technique and double-spacer custom tray: A case report

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ABSTRACT

Keywords: Complete denture, Double spacer custom tray, Flabby ridge, Impression techniques, Open-Window technique

A flabby ridge is an area of mobile soft tissue found superficially, which affects both maxillary and mandibular alveolar ridges. It is a common finding in long term denture wearers, where the rate of bone resorption is very fast leading to development of hyperplastic soft tissue over the alveolar bone. These mobile, hyperplastic tissues compromise denture stability and retention, leading to patient discomfort and functional limitations. A precise impression is essential for ensuring the stability of complete dentures with flabby ridge. The fundamental principle for impressions of a flabby ridges is to apply minimal pressure on the flabby area to prevent distortion impression outcome. To achieve that, open-window technique and double spacer custom tray along with selective pressure impression techniques was employed. This case report aims to gain impression with minimum pressure on flabby ridge to enhance retention, support, and stability of the complete denture. A 63-year-old male patient came to the Department of Prosthodontics, Padjadjaran University, complaining that his old 10-years-used denture felt loose and uncomfortable. Intraoral examination showed that both maxillary and mandibular arches were fully edentulous, with flabby ridges present. Following the assessment, it was decided to make a new complete denture using double spacer custom tray and open-window impression techniques. Double spacer custom tray and open-window impression techniques helped in recording flabby tissue with minimal displacement and hence enhanced the stability, support, and retention of the denture. (IJP 2025;7(1):65-70)

Introduction

The main aim of complete denture prosthodontics is to rehabilitate the patient's missing teeth and adjacent bone by providing a stable prosthesis, which in turn restores function, esthetics and comfort in the patient. The success of a complete denture prosthesis is often determined by its retention, stability, and support during function. Ideally, the alveolar ridge should be covered by masticatory mucosa of 1.5–2 mm thickness for adequate soft tissue support for the denture.¹⁻³

In cases of a flabby ridge, the normal tissue support is absent, and instead, there is highly movable soft tissue on the surface of the alveolar ridge. It affects both maxillary and mandibular alveolar ridge but it is most commonly seen in the maxillary anterior ridge. Studies have shown that flabby ridge occurs in 24% of maxillary and in 5% of mandibular edentulous ridge. It is developed when hyperplastic soft tissue replaces the alveolar bone. Leading to an unstable denture positioning and dissatisfaction for the wearer while also compromising the quality of the denture bearing tissue. Therefore, proper prosthodontic management is essential to restoring the patient's function, esthetics, and speech.^{2,4}

Flabby tissue occurs due to the replacement of alveolar bone with fibrous tissue. It commonly develops in the anterior maxilla, especially when natural anterior teeth remain in the mandible—a condition known as combination syndrome—which results in unstable occlusal forces from the

remaining natural teeth, thereby creating excessive loading on the residual ridge.⁵ Among the various etiological factors proposed by Desjardin and Tolman, bone resorption, excessive atrophy of alveolar bone, nutritional deficiencies, improper forces were considered detrimental for flabby ridge development.¹

Flabby tissue develops due to excessive pressure or unstable occlusion acting on the alveolar bone that supports the denture. This continuous stress leads to the resorption of alveolar bone, which is subsequently replaced by hyperplastic fibrous soft tissue. As a result, the presence of flabby tissue can interfere with denture retention, stability, and support.^{6,7} Complete denture support becomes compromised when mobile flabby tissue is displaced by more than 2 mm under functional pressure.^{8,9} Excessive movement of this tissue can lead to clinical complications, including denture dislodgement and pain during function.⁹ Due to its poor supportive capacity, flabby tissue is easily displaced under load, which may reduce denture retention by interfering with the peripheral seal.¹⁰

Management of flabby tissue is generally divided into three approaches. First, a surgical approach involving excision of the flabby tissue prior to denture fabrication. Second, fabrication of implant-supported dentures. Third, a non-surgical approach using conventional dentures with modified impression techniques.^{4,11,12} Surgical removal

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Figure 1. Extraoral profile of the patient.

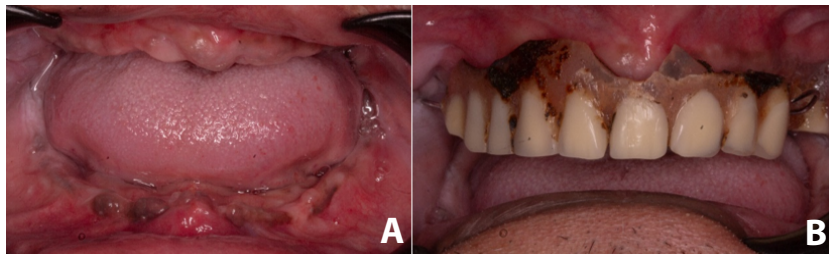


Figure 2. Intraoral findings of the patient; A. Without denture, B. With denture.

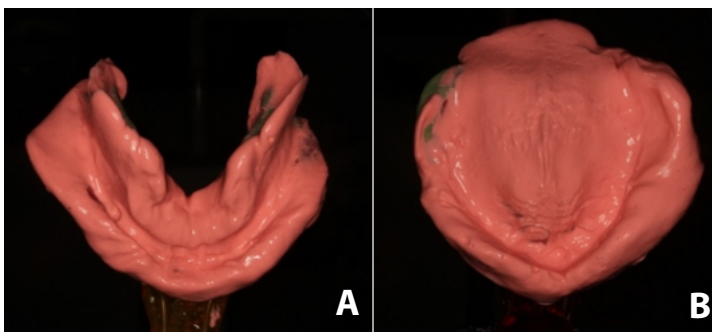


Figure 3. Preliminary impression with alginate; A. Maxillary impression, B. Mandibular impression.

of flabby tissue is considered an effective method to create a firm denture-bearing area. However, this approach may reduce vestibular depth, thereby decreasing denture retention. Implant-supported prostheses provide additional support from the underlying bone and minimize reliance on soft tissue support, but they require higher costs and longer treatment time. Compared with the two approaches above, the non-surgical method using conventional prostheses with modified impression techniques and balanced occlusal contacts is more commonly selected, particularly for patients with compromised general health or limited financial resources.¹³

Problem with flabby ridge is as if a flabby ridge is compressed during impression making, it will later tend to recoil and dislodge the resulting overlying denture. So, an impression technique is required which will compress the non-flabby tissues to obtain optimal support and as well as not displace the flabby tissues. Many techniques have been recorded in literature to deal with flabby ridge as:¹⁴ mucostatic impression technique; double spacers; multiple relief holes; and window tray technique.

Watson described the 'window' impression technique

where a custom tray is made with a window or opening over the (usually anterior) flabby tissues.¹⁴ A mucocompressive impression is first made of the normal tissues using the custom tray and zinc oxide and eugenol. Once set, it is removed, trimmed, and re-seated in the mouth. A low viscosity mix of 'plaster of Paris' is then painted onto the flabby tissues through the window. Once set, the entire impression is removed. Nowadays, more easy to use materials like polyvinylsiloxanes (silicones) are being used. This article describes a case report using polyvinylsiloxane impression material and different impression techniques.¹⁴

Case Report

A 63-year-old male patient presented to the Prosthodontics Clinic of Oral and Dental Hospital (RSGM) Universitas Padjadjaran with a chief complaint of difficulty chewing due to the loss of all teeth in both the maxilla and mandible. The patient had been wearing maxillary and mandibular complete dentures for approximately 10 years; however, the dentures had become loose and caused pain, particularly during mastication. The patient reported no relevant systemic conditions. He expressed a desire to have new dentures fabricated that would provide greater comfort and eliminate pain during use [figure 1](#).

Intraoral examination revealed complete edentulism in both the maxilla and mandible. Flabby ridges were observed in the anterior region and right tuberosity of the maxilla, as well as in almost the entire mandibular ridge [figure 2](#). Due to financial constraints, the patient declined treatment options involving a surgical approach or implant-supported complete dentures. After discussion, it was decided to fabricate a new conventional removable complete denture.

Following the patient's approval of the treatment plan and completion of informed consent, a preliminary impression was made using irreversible hydrocolloid (alginate) [figure 3](#) to obtain a study cast. The impression was subsequently poured with dental stone [figure 4](#). On the study cast, a double wax spacer was fabricated, with additional spacer placed over the flabby tissue areas in both the maxilla and mandible [figure 5](#). A custom tray was then constructed using a light-cured resin material. The borders of the custom tray were designed to be 2 mm short of the mucobuccal fold to allow space for muscle activation during border moulding. The lips, cheeks, and tongue movements were evaluated during the intraoral try-in of the custom tray.

Border moulding of both the maxillary and mandibular arches was performed using greenstick compound along the borders of the custom tray [figure 6](#). The wax spacer was then carefully removed from the custom tray without disturbing the greenstick compound. Escape holes were subsequently created in the custom tray; in the flabby areas, the holes were

made more numerous and wider to minimize pressure during the final impression procedure.

The outline of the flabby ridge was marked intraorally using an indelible marker [figure 7](#). The final impression was made using polyvinyl siloxane (PVS), with light-body material applied over the flabby areas and regular-body material over the non-flabby areas [figure 8](#). Beading and boxing procedures were then performed on the impression, which was subsequently poured with dental stone to obtain the master cast [figure 9](#).

Record bases and wax occlusion rims were fabricated on the master casts [figure 10](#). The maxillary and mandibular occlusion rims were then tried in the patient's mouth. First, the parallelism of the maxillary occlusion rim was evaluated using a Fox plane. At this stage, orientation lines were also marked on the occlusion rim, including the high lip line, low lip line, midline, and canine lines.

Subsequently, the mandibular occlusion rim was tried in, followed by the determination of the patient's vertical dimension and centric relation. The vertical dimension at rest was measured at 76 mm, and the vertical dimension of occlusion was established at 73 mm. After recording the vertical dimension and centric relation, a facebow transfer was performed to transfer

the maxillomandibular relationship to the cranial base onto the articulator. The occlusion rims were then secured using a stapler and removed from the patient's mouth.

The master casts with the occlusion rims were mounted on a semi-adjustable articulator [figure 11](#). During this visit, the shade and shape of the artificial teeth were selected according to the patient's skin tone, facial form, age, and gender, followed by the arrangement of the maxillary and mandibular artificial teeth [figure 12](#).

The next step was the wax denture try-in in the patient's mouth [figure 13](#). At this stage, aesthetics, midline position, low lip line, smile line, as well as centric and eccentric occlusion were evaluated. After confirming that the results were satisfactory, the dentures were processed in the laboratory, which included packing, finishing, and polishing procedures [figure 14](#).

The completed dentures were evaluated for any sharp edges, unpolished areas, or rough surfaces. Subsequently, the dentures were inserted into the patient's mouth. During insertion, retention, stability, adaptation, denture base extension, centric and eccentric occlusion, as well as aesthetics were assessed [figure 15](#). The patient was also re-instructed on the proper insertion and removal of the prostheses, along with instructions regarding denture hygiene and maintenance.

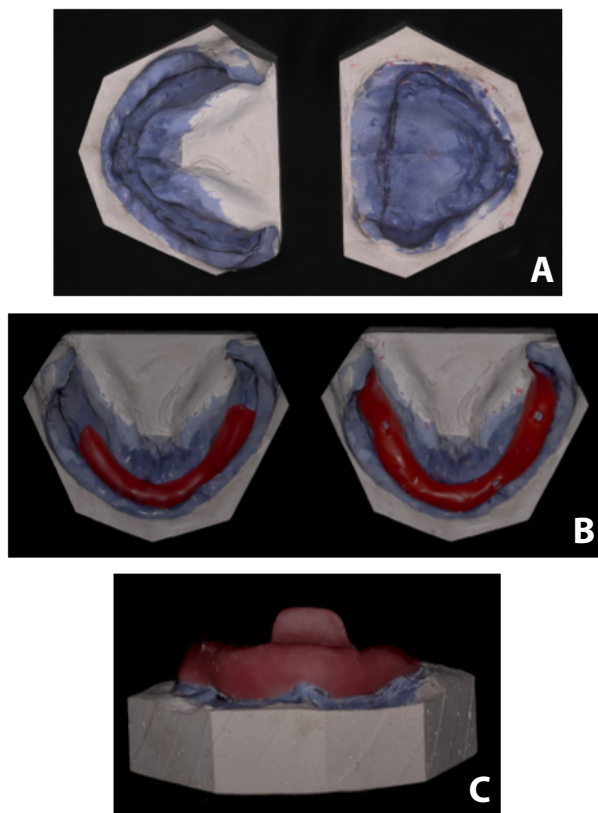


Figure 4. A. Cast Study; Fabrication of double spacer on, B. Mandible, C. Maxilla

Discussion

The success of complete denture treatment largely depends on obtaining an accurate impression of the edentulous ridge and functional sulcus. The presence of flabby tissue can compromise denture retention and stability due to the elastic recoil of the fibrous soft tissue within the flabby ridge during function. In the selective pressure technique, tissues are intentionally compressed during impression making. However, when conventional impression techniques are used in cases with flabby ridges, the flabby tissue may also become compressed. Fabricating a denture over compressed flabby tissue can lead to compromised retention and stability, resulting in frequent denture dislodgement.^{10,12}

Several impression techniques and methods have been described in the literature for recording flabby tissue during impression making. However, there is no evidence to support that one impression technique will provide a stable and retentive denture on flabby ridges as compared to others. To obtain optimal support, impression technique plays a crucial role in the fabrication of dentures in cases with flabby tissue. The impression should apply pressure to the non-flabby tissues while avoiding pressure on the flabby areas.¹⁵ Modified custom trays are specifically fabricated as an alternative approach to manage edentulous cases with flabby tissue.² This report presents an innovative win-

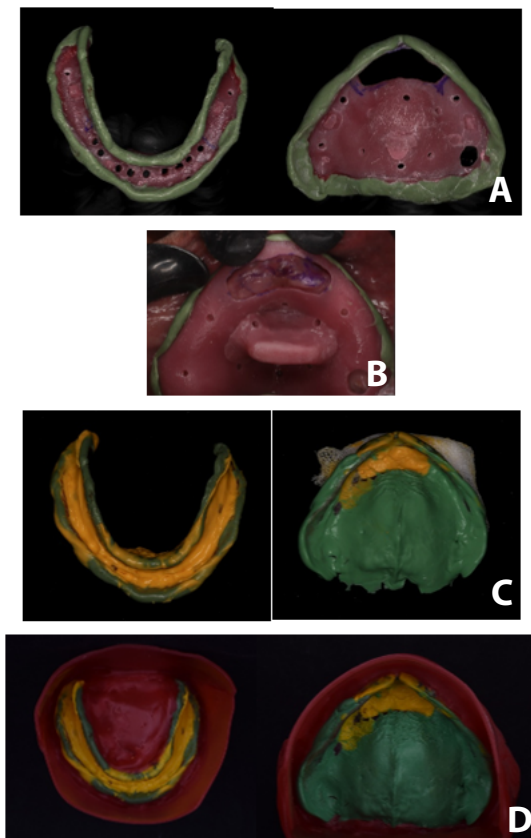


Figure 5. A. Border moulding, removing wax spacer and creating escape holes, B. The outline of the flabby ridge was marked in the patient's mouth, C. Final impression; Mandible; Maxilla, D. Beading and boxing; Mandible; Maxilla.

dow technique for the impression of anterior maxillary flabby ridge and double spacer for the impression of mandibula flabby ridge using PVS impression material.¹

In addition to the continuous debate between mucostatic and selective impression techniques, the literature also addresses the use of modified or alternative procedures and the use of other materials. Several techniques have been documented, including spacers or perforations, sectional trays, and split trays. Nevertheless, there is no proof that one method is better than another for producing a stable and retentive denture on flabby ridges.¹⁰

The window technique for taking an impression of the anterior maxillary flabby ridge is explained in this article. Normal tissues are subjected to a mucocompressive / selective pressure impression technique, and the tissue is captured in its static state by the impression plaster covering the window. Choosing a window is likely the best way to ensure that the flabby tissue is not under any pressure. Recent studies on various tray designs have shown that the tray with a window causes the fewest tissue alterations. Using impression plaster during the imprinting process may cause the tissues to be compressed or moved. The flabby tissue can fully return while the plaster is setting, as the tray design includes a window to prevent the plaster from being

restricted to the tray. Additionally, the therapist can observe how the impression material is adjusting to the flabby tissue due to the open tray. It is crucial that the flabby area be recorded while at rest, without any compression or displacement. Another benefit of the window is that, even under pressure, the flabby tissue can return to its resting position. Therefore, a window and impression materials such as impression plaster are crucial for documenting the resting condition of a flabby ridge. Moreover, this modified impression method decreases chairside time and the requirement for extra clinical steps/appointments. This easy, affordable, and simple method can reduce the amount of movement of the flabby tissue during the impression procedure.¹⁰

The selective pressure impression technique is a widely used approach aimed at improving denture function and patient comfort. This technique works by selectively applying pressure to primary stress-bearing areas while minimizing pressure on non-stress-bearing regions, thereby promoting a more even distribution of masticatory forces. It typically involves the use of custom trays, selective relief of specific areas, and dual-viscosity impression materials to achieve accurate recording of the oral tissues.¹⁶

Flabby tissue should be recorded in a mucostatic condition, meaning in a resting state. Impression technique and impression material are two factors that can conservatively address this issue.¹² Several methods are used to provide relief to flabby tissue, including custom trays with additional escape holes, double spacers, and window techniques in custom trays.⁹ Previous studies have reported that using custom trays with escape holes greater than 1 mm in diameter or a spacer thickness of 1.4 mm can effectively reduce pressure in edentulous areas. Pressure on flabby tissue can be minimized by providing additional relief space in the flabby area through the placement of two layers of baseplate wax as spacers and by increasing the number or size of escape holes in the custom tray.^{9,17} The wax spacer placed in the custom tray provides sufficient space for the flow of low-viscosity final impression material, while the additional escape holes create an outlet pathway for excess material, thereby reducing pressure on the flabby area during impression making.¹⁸

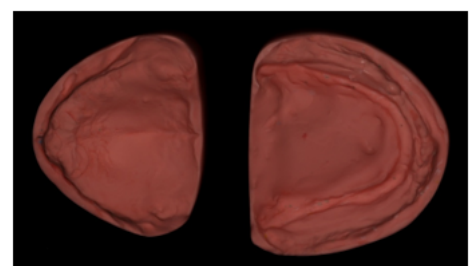


Figure 6. Master cast

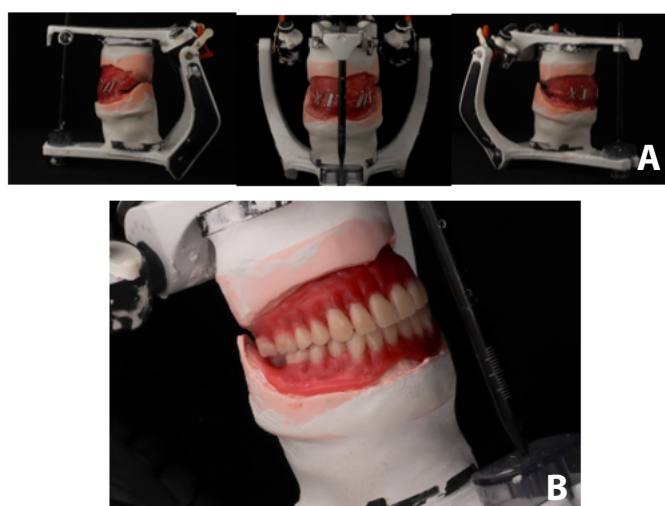


Figure 7. A. Mounting on articulator, B. Arrangement of artificial teeth for the maxilla and mandible on semi-adjustable articulator.



Figure 8. A. Evaluation of wax denture try-in: (a-c) occlusion from the left, front and right views, B. Complete dentures of the maxilla and mandible, C. Insertion of the complete dentures of the maxilla and mandible

Impression material selection is also a critical aspect in managing flabby tissue. The flow properties of the material significantly influence impression success. Polyvinyl siloxane (PVS) is an elastomeric impression material commonly used in clinical practice. PVS is available in various viscosities, including extra light, light (wash), medium (regular), heavy, and putty (extra heavy).¹⁹ These different viscosity forms allow adaptation to the selected impression technique.

In this case, the flabby tissue in both the maxilla and mandible was most likely caused by the long-term use of ill-fitting dentures and unstable occlusion over a 10-year period without regular

follow-up. Management was performed using a non-surgical approach by modifying the impression technique through the use of a double spacer. This non-surgical approach was selected based on the patient's preference, considering both treatment cost and duration.

Custom trays were fabricated with a double spacer and additional escape holes in the flabby areas of both the maxilla and mandible. The final impression was made using dual-viscosity polyvinyl siloxane (PVS) impression material, with regular-body material applied to the non-flabby areas and light-body material applied to the flabby areas. Tooth arrangement was performed until balanced occlusal contacts were achieved to minimize unstable occlusion during function. Following denture insertion, the patient reported satisfaction and improved comfort compared with the previous dentures. This case demonstrates that the double spacer impression technique can be an effective approach for managing complete edentulous patients with flabby tissue during the fabrication of complete dentures.

This case report has several limitations. First, it describes the management of a single patient, which limits the generalizability of the findings to a wider population with flabby ridge conditions. Second, the follow-up period was relatively short, and longer-term evaluation is required to assess the stability, retention, and tissue response to the dentures over time. Additionally, the clinical outcomes were primarily based on subjective patient feedback and conventional clinical examination, without quantitative measurements of pressure distribution or tissue displacement. Therefore, further studies with larger sample sizes and longer observation periods are needed to better evaluate the effectiveness of the double spacer impression technique.

Conclusion

The impression technique utilizing a double spacer and additional escape holes in a custom tray has been shown to effectively reduce pressure that may otherwise compress flabby tissue during the impression procedure. This approach plays an important role in obtaining an accurate tissue record and contributes to the fabrication of more precise and comfortable complete dentures for patients with flabby ridge conditions.

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