

A method of impressing flabby ridge

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ABSTRACT

Flabby ridge remained a challenge in dental clinical practice to obtain an accurate impression for edentulous patients. During the traditional impression making process, the excessive and displaceable soft tissue are usually compressed. In this article, we presented an impression method by using a modified special stock tray, impression compound and polyvinyl siloxane impression materials.

- the suitable stock tray was modified with holes about 5 mm diameter in the corresponding area to the crest of the flabby ridge.
- the primary impression was made by position the modified tray with the softened compound impression on the edentulous ridge, avoiding the area of the flabby ridge.
- the final accurate impression was obtained by using the light body polyvinyl siloxane impression material.

Specifications table

Subject area:	Medicine and Dentistry
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Name of your method:	A method of impressing flabby ridge
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Method details

Background

For edentulous patients, especially for those who has poor physical foundation, severely insufficient jaw bone mass, or insufficient economic conditions, removable complete denture still remains the primary choice for prosthetic solution [1,2]. To accomplish a good performance for complete denture, an accurate impression of the denture bearing and limiting areas must be assured. Flabby ridge, occurred in approximately 24 % of the edentate maxillae and 5 % of the edentate mandibles [3], which is known for its deformable and displaceable, remained a challenge in dental clinical practice to obtain an accurate impression. During the

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traditional impression making process, the excessive and displaceable soft tissue are usually compressed, which would decrease the accuracy of the final functional impression, which would afterwards adversely affect the retention and stability of complete dentures.

The handling of the flabby ridges has been proposed using three main strategies. Surgical removal of the displaceable soft tissue has been considered as an effective way to provide a firm denture-bearing area. However, this strategy may result in the pain and discomfort to patients, as well as the decrease of vestibular height which is disadvantageous to denture retention. Implant retained prosthesis, which can draw support from the underlying bone thus minimize support from the soft tissue area, requires more economic cost for patients [4,5] and longer time to complete the treatment procedure. Compared to the two methods described above, the conventional prosthodontic approaches, such as modified impression technique and balance of occlusal loads, is more frequently employed, [6,7] especially for patients those who have poor general health or economic conditions.

Numerous impression modification techniques, including scraping of impression tray, improvement of impression tray design, window technique, optimization of impression material, and alteration of impression seating velocity, have been documented to overcome the challenges caused by flabby ridges. Trays designed with additional space or multiple perforated holes, trays designed in a detachable mode, and trays designed open at the corresponding site in the flabby ridge area have been confirmed in favor of reducing flabby ridge displacement [8,3]. The “window” impression technique, which means a custom tray with an opened window over the flabby ridge, have been described by Osborne for better impression acquisition and followed by others [9]. Lynch was able to overcome this challenge and gained satisfaction in stability, aesthetics, and function by using the custom perforated tray and polyvinylsiloxane impression materials [3]. Trays designed with holes, or trays with openings over flabby ridge area have been demonstrated by Shin to reduce flabby tissue displacement. [8] Trays have also been designed by Mostafa using combination of several techniques, including window technique, two-step impression technique, and polyvinyl siloxane elastomeric impression material for a patient with a flabby maxillary ridge [10]. The complexity of these approaches is often needed quite more time to perform, thus additional clinical visits are required compared to conventional complete denture. This phenomenon therefore increases the burden to patients especially for those who have mobility difficulties. Considering the advantage of simplified procedure in reducing number of visit and time, as well as showing no adverse effect on clinical aspects of denture quality and patients’ perceptions of the treatment, single impression technique using stock tray was applied in the impression making procedure in this study. To solve the challenges encountered in impressing the complete denture-bearing areas containing flabby ridges, this article presents an impression technique by using a modified special stock tray, impression compound and polyvinyl siloxane impression materials.

Methods details

1. Firstly, an intra-oral examination of participants’ edentulous conditions (Fig. 1) was done, including arch size, the range and the location of the flabby ridge.
2. Following with an intra-oral examination, a suitable stock tray (Shanghai PHARMA, China) was chosen. The border of the tray was adjusted to be about 2 mm shorter of the functional depth of the labial and lingual sulci (Fig. 2). Then, the stock tray was verified intraorally to eliminate over-extended or under-extended borders and adequate relief for frenal attachments was confirmed.
3. The edge of the flabby ridge was marked with an indelible marker (Fig. 1C), then the tray was placed on the ridge, and the crest of the flabby ridge was transferred to the stock tray. Using a straight bur (SR-11, MANI Inc, Japan), the stock tray was modified with holes of about 5 mm diameter in the corresponding area to the crest of the flabby ridge (Fig. 3).
4. The impression compound (Shanghai PHARMA, China) should be softened in water at a temperature of 50 °C, then the softened impression compound was placed into the modified stock tray. The tray with the compound impression was carefully positioned on the maxillary edentulous ridge, avoiding the area of the flabby ridge. During this process, muscle function shaping was performed to ensure optimal adaptation. After the impression compound was hardened, the tray was removed from the patient’s mouth and the impression borders was inspected. The impression border molding was done in segments by using impression compound (Fig. 4).
5. The concave areas of impression compound was scraped off with a knife. Additionally, approximately 1 mm in the labial, lingual-palatal tissue, and hard palate regions as buffers was scraped off (Fig. 5).



Fig. 1. Intra-oral image of the maxillary and flabby ridge.

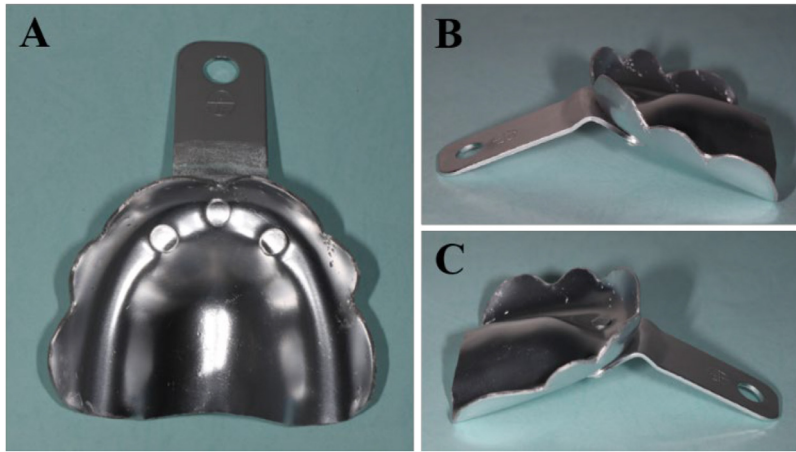


Fig. 2. The suitable stock tray.



Fig. 3. The modified stock tray with holes (5 mm).

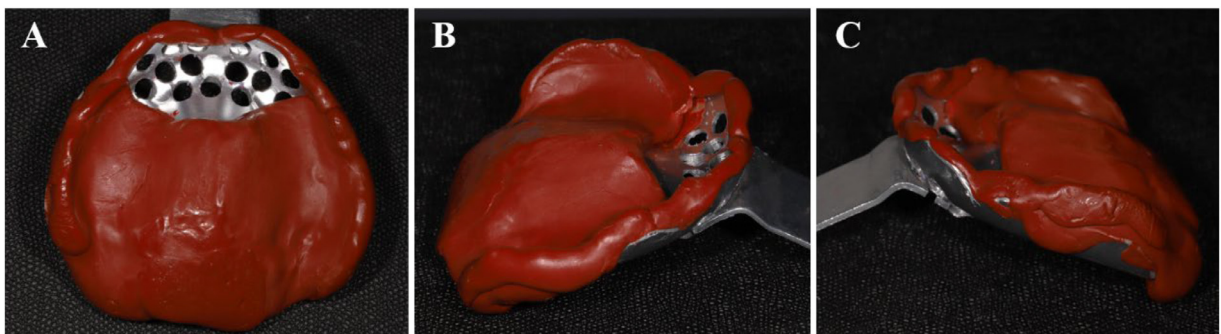


Fig. 4. Primary impression with border molded.

6. By using the light body polyvinyl siloxane impression material, the final maxillary impression was obtained (Aquasil, Dentsply, USA) (Fig. 6). During this step, muscle function was preformed and shaped to optimize the accuracy of the impression.
7. After removed and disinfected, the completed final impression was cast in type III dental stone (Modern Materials Denstone, Heraeus Kulzer, Germany) (Fig. 7). The bordered moulded sulcus area was carefully preserved during the cast modification.

Method validation

After maxillomandibular relationship record, try in and processing, the denture was inserted intraorally (Fig. 8). Clinical examination revealed that the denture constructed with this impression method was stable and retentive. Follow-up was done at 1



Fig. 5. The adjusted primary impression.

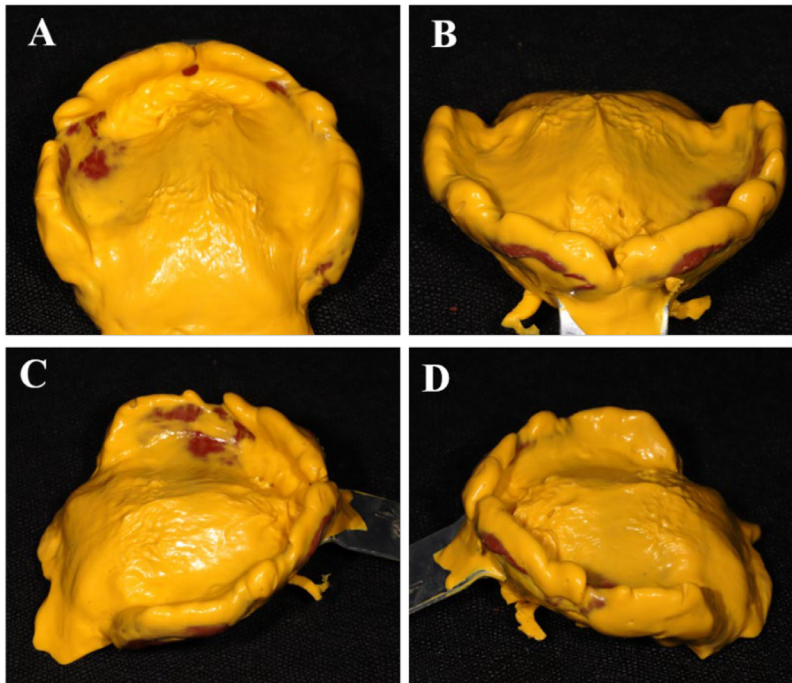


Fig. 6. The completed final impression.

and 2 weeks, 1 and 3 months. Patients were satisfied with the retention, stability, and esthetics of the complete denture, and the chief complaint of difficulty on chewing food and ill-fitting was reduced compare to the denture constructed with the traditional method.

In addition to retention, stability and support, patients also desire lower costs and reduced clinical time. In developing countries, the cost-effectiveness and desirable physical and mechanical properties make impression compound indispensable. Research has confirmed that a single impression using stock trays with border molding can achieve similar overall satisfaction compared to the two-step impression technique using custom trays [11-13]. In the present study, a modified special stock tray, impression compound, and polyvinyl siloxane impression materials are utilized along with border molding technique to address the challenge of accommodating flabby tissues in the denture bearing area.

The present method exhibits distinct advantages. Firstly, it effectively prevents the displacement of flabby tissue by minimizing excess forces during the impression process. Simultaneously, it provides support for the impression material (polyvinyl siloxane or others) in the flabby tissue area. Moreover, this technique proves to be cost-effective for patients and convenient as it reduces the time required for prosthesis fabrication.

The modified impression method reduces the chairside time and the need for additional clinical steps or appointments. With this convenient, cost-effective, and straightforward approach, the displacement of flabby tissue can be minimized during the impression process.

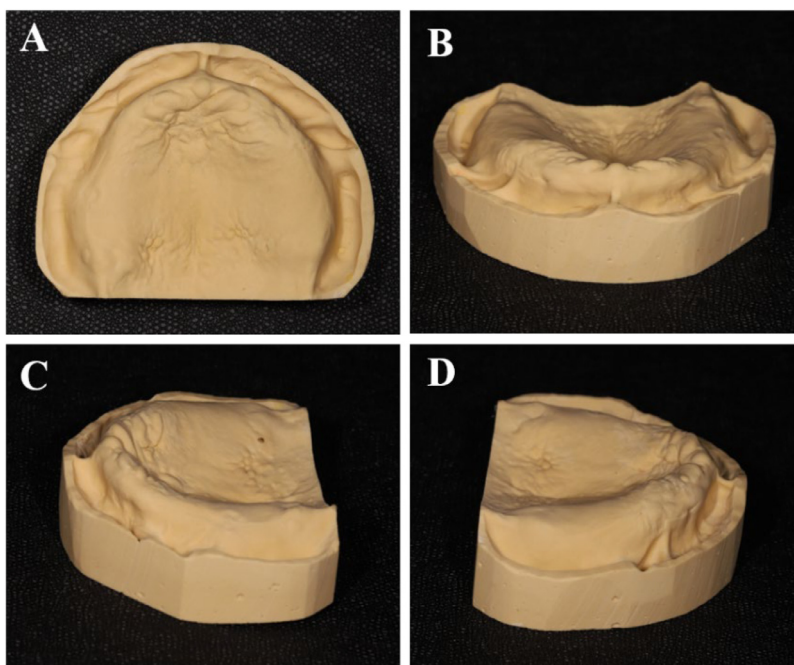


Fig. 7. The completed master impression.



Fig. 8. The complete denture prosthesis. A. Tissue surface. B. Polished surface. C. Initial placement.

Ethics statements

This study has been approved by Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine Ethics Committee, with approval number SH9H-2023-T273-2. Written informed consent will be collected from each participant prior to any study procedures, and each participant will receive contact information. Participants consented to have these images of participants published.

CRediT author statement

Guifang Wang: Methodology, Investigation, Data curation, Investigation
Kaige Lv: Validation, Data curation, Conceptualization, Writing-review & editing

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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