



CASE REPORT

Management of the flabby ridge using a modified window technique and polyvinylsiloxane impression material



Nawaf Labban

Department of Prosthetic Dental Science (SDS), College of Dentistry, King Saud University, Riyadh 11545, Saudi Arabia

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KEYWORDS

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Abstract Flabby ridge is a common clinical finding affecting the alveolar ridges of the mandibular or maxillary arches. The anterior region of maxilla is the most affected area in edentulous patients. Dentures on flabby ridges have compromised stability, support, and retention unless adequate measures for its management are employed. Methods applied for flabby ridge management, include surgical removal and augmentation, special impression techniques, balanced distribution of occlusal loads and implant therapy. Special impressions often involve window technique for static impression of flabby area, which present multiple challenges. The purpose of this technique report is to present a modified window technique for the impression of anterior maxillary flabby tissues for improved and controlled application of polyvinylsiloxane impression material that are routinely available in dental practice.

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1. Introduction

The objective of complete denture prosthodontics is restoring esthetics, comfort and function by replacement of missing dental and alveolar structures using a stable prosthesis. Preferably, the residual ridge is overlaid with 1.5–2 mm thickness of the masticatory mucosa for adequate soft tissue support for the denture (Desjardins and Tolman, 1974). Flabby ridge can be defined

as a mobile soft tissue which is located on the superficial aspect of the alveolar ridge (Pai et al., 2014). Flabby ridge can also be called a displaceable ridge or a fibrous ridge. Studies have reported, approximately 5% of the edentate mandibles and 24% of the edentate maxillae to have flabby ridges (Lynch and Allen, 2006; Carlsson, 1998; Xie et al., 1997). Flabby ridges mainly arise when an edentulous ridge opposes natural teeth and is considered a feature of the combination syndrome when occurs in the anterior part of maxilla (Lynch and Allen, 2004; Kelly, 1972). In the presence of displaceable ridge, fabrication of a stable denture becomes an arduous challenge. Flabby ridges get easily displaced under occlusal forces owing to poor support, resulting in compromised denture retention as a consequence of loss of peripheral seal (Pai et al., 2014). According to MacEntee, support for the complete dentures is significantly compromised if the flabby ridge has more than 2 mm displacement under

E-mail address: nawafllabban@gmail.com

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pressure (Bindhoo et al., 2012; MacEntee, 1996). Retention, support and stability of complete dentures is compromised by flabby ridges unless the tissue is appropriately managed and manipulated by special impression techniques.

Multiple techniques for the management of flabby ridges have been proposed (Lynch and Allen, 2006). Surgical methods include removal of flabby ridge using scalpel surgery or by injecting a sclerosing agent prior to fabrication of complete denture (Pai et al., 2014). In addition, surgical ridge augmentation is also proposed in the management of flabby ridges (Desjardins and Tolman, 1974; Pai et al., 2014; Lynch and Allen, 2006; Kelly, 1972; Bindhoo et al., 2012; MacEntee, 1996). However, surgical removal of the flabby tissue increases the bulk of denture material and eliminates stress absorbing soft tissues, leading to trauma of the underlying tissues (Crawford and Walmsley, 2005). Furthermore, conventional prosthodontic methods such as, special impression techniques and balancing of occlusal loads are more frequently employed in the management of dentures with flabby ridges (Pai et al., 2014; Crawford and Walmsley, 2005; Liddelow, 1964).

Several impression techniques are proposed in the literature for recording flabby ridges with the minimum amount of tissue displacement (Bansal et al., 2014). These techniques include, muco-compressive (displacive, entire denture bearing tissues are displaced), muco-static (non-displacive, denture bearing tissues are not displaced) and selective pressure impression (denture bearing tissues are selectively displaced) (Lynch and Allen, 2006; Appelbaum and Rivetti, 1985; McCord and Grant, 2000). There has been a lot of controversy about the most suitable impression technique for flabby ridges (MacEntee, 1996), and recording tissues at rest is repeatedly found in the literature and has gained acceptance by many clinicians (MacEntee, 1996; Boucher, 1951; Klein and Broner, 1985; Hyde et al., 2008; Devan, 2005; Zinner and Sherman, 1981). When utilizing this concept (mucostatic impression technique), double spacers, multiple relief holes, or a window tray technique has been used where the flabby tissue is located (MacEntee, 1996; Boucher, 1951; Klein and Broner, 1985; Hyde et al., 2008; Devan, 2005; Zinner and Sherman, 1981). Magnusson et al., (Xie et al., 1997) presented an impression technique using two different impression materials in a custom tray. Materials applied included impression plaster on the flabby ridge and zinc oxide and eugenol over healthy tissues (Magnusson et al., 1986). Similar technique was also reported by Liddlelow (Bansal et al., 2014). In another study by Osborne, two different impression materials using two separate custom trays were utilized (Osborne, 1964). Moreover, a technique using impression compound in custom tray followed by a wash impression using zinc-oxide-eugenol was described by Watt and McGregor (Watt et al., 1986). They claimed, it would reduce the movement of denture base under occlusal loads. This technique was recently reevaluated with the use of polyvinylsiloxane (PVS) impression materials by Lynch and Allen (2003). Earlier, a window impression technique was proposed by Watson, to minimize the movement of flabby ridge during function. They created a window in the custom tray over the flabby tissues anteriorly, and used the impression plaster for the flabby ridge and zinc-oxide-eugenol impression paste for the healthy denture bearing area (Watson, 1970). However a possible limitation of window technique is failure to control and uniform application of impres-

sion material. The purpose of this technique paper is to present a modified window technique for flabby tissues with better material control and application of PVS impression material.

2. Technique report

A 65 year old male patient reported to the prosthodontic clinic at School of Dentistry, with a complain of ill-fitting maxillary complete denture from a year. On intra-oral examination, an edentulous maxillary arch with severely displaceable anterior flabby ridge was observed (Fig. 1). It was planned to provide the patient with a new maxillary conventional complete denture. A special window impression technique using PVS material for the definitive impression was considered. The technique is as follows,

- 1- A Primary impression was made with alginate (Zelgan, Dentsply) material using edentulous stock trays.
- 2- A maxillary cast was poured and the flabby ridge area was marked, (Dental stone, Type III, Kulzer) followed by fabrication of custom tray [spaced (2 mm), tissue stops] (Triad, Tru tray, Denstsply) with two posterior handles (Fig. 2).



Fig. 1 Intraoral image of the maxillary flabby ridge.



Fig. 2 A custom tray was fabricated on the maxillary cast with two posterior handles with.

- 3- The anterior window in the marked area was outlined using sharp knife before curing the tray material to facilitate removal of the window at a later stage (Fig. 2).
- 4- A vacuum heat pressed polyethylene sheet of 0.5 mm thickness was adapted on the tray after curing (Fig. 3).
- 5- The window was removed and three holes of similar dimensions were placed on the polyethylene sheet in the window area (Fig. 4).
- 6- The tray was tried in the patient mouth and the flanges were adjusted to be 2 mm shorter than the depth of sulcus using a slow-speed motor and carbide acrylic-trimming bur.
- 7- Border molding was performed using the conventional technique with green stick impression compound (Dental Kerr Impression Compound). Following which a maxillary impression was made using heavy body PVS impression material (Aquasil, Dentsply) (Fig. 5). However, border molding can be achieved by using any technique described in the literature.
- 8- The impression was evaluated carefully for defects and any excess material on the periphery was removed. In addition, the impression material in the area of flabby ridge was carefully removed using scalpel blade (Fig. 6).



Fig. 3 Vacuum pressed polyethylene sheet, trimmed and removed from cast.



Fig. 4 The window was removed and three holes on the polyethylene sheet were made in the window area.

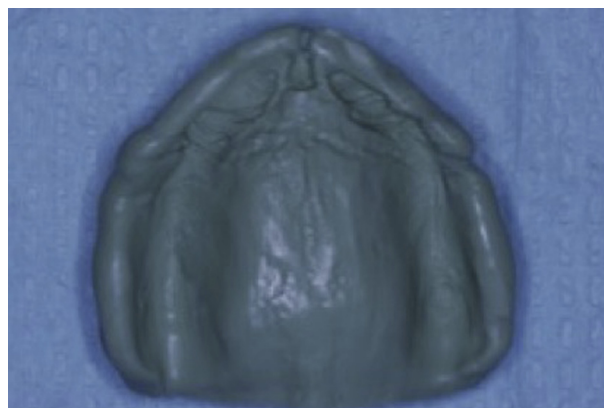


Fig. 5 Maxillary impression with regular body polyvinylsiloxane impression materials.

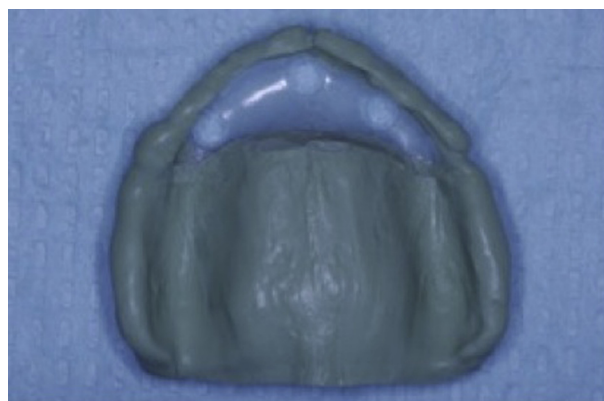


Fig. 6 The excess materials on the periphery and the opening area were removed away using scalpel blade.



Fig. 7 Injection of light body polyvinylsiloxane impression material through the tray holes.

- 9- The impression was re-seated in the patient mouth and a light body PVS impression material (Aquasil, Dentsply) was injected starting from one of the side holes passing through the middle of the polyethylene sheet until some

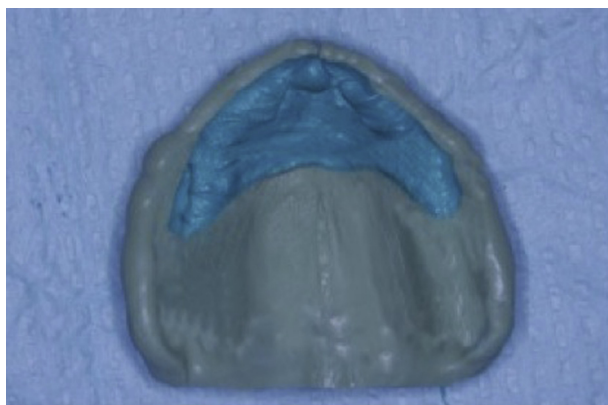


Fig. 8 The completed final impression.



Fig. 9 Maxillary complete denture showing gold occlusal onlays on posterior teeth.

excess material poured from the holes (Figs. 7 and 8).

- 10- A master cast was poured from the impression (by using boxing and pouring) and record block was fabricated for jaw relation procedure.
- 11- Following try-in, a maxillary conventional complete denture was completed using gold occlusal onlays on posterior teeth for better occlusal stability (Fig. 9).

3. Discussion

An accurate impression of the edentulous ridge and functional sulcus is critical to the provision of a stable and retentive denture. Flabby ridges when recorded using a conventional method are compressed during impression. The elastic recoil of flabby fibrous soft tissue during function results in instability and loss of denture retention and dislodgement (Pai et al., 2014; Allen and McCarthy, 2003). 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 particular impression technique will provide a stable and retentive denture on flabby ridges as compared to others (McCord and Grant, 2000). This report presents a modified window technique for the

impression of anterior maxillary flabby ridge using PVS impression material.

A window technique is used for impression of flabby ridge using a close fitting custom tray with a window (Watt et al., 1986). In the window technique, studies have proposed to record the impression along with the peripheral seal followed by preparation of window and recording of displaceable tissues with a low viscosity impression material (impression plaster) (McCord and Grant, 2000; Ahmed et al., 2008). Others have suggested that in order to allow for accurate peripheral tracing of the functional sulcus and improved final impression, a custom tray with a window should be prepared prior to recording of final impression and displaceable tissue should be recorded in a static position through the window after final impression (Allen, 2005; Polychronakis et al., 2010). Using these techniques, a mucocompressive impression is recorded for healthy tissues using zinc oxide and eugenol or regular body PVS and a custom tray. Following the setting of the impression material, the flabby tissues are painted using with a low viscosity mix of impression material (impression plaster) through the open window. A common clinical challenge in this technique is the difficulty in uniform application and control of low viscous impression material on flabby tissues due to gravitational forces and different dental chair positions (maxillary arch). In addition PVS materials are preferred by clinicians as they are available in different viscosities suitable for mucostatic and muco-compressive flabby ridge impressions (Lynch and Allen, 2005; Fokkinga et al., 2017). In addition, heavy body PVS use was to provide compressive impression in the area other than flabby ridge and also to provide stable replacement of impression during light body PVS application. Although PVS provides accuracy, for open window technique, controlled application is still a concern. Moreover, the modified window technique allows for controlled application of low viscosity materials in addition to the minimal exertion of pressure to the flabby ridges due to the presence of vents. The initial marking of the tray using sharp blade prior to curing allowed for easy removal of window. Moreover, the vents in the polyethylene sheet were appropriately sized to allow for application of light body PVS. Furthermore, the clear polyethylene sheet in this technique performed as a stent for holding and preventing the low viscosity material from dropping away from the tissue (allowing control and uniform application). In addition the visibility from the clear tray helps clinicians to see the adaptation of impression material to the flabby tissue. Therefore the authors recommend clinical application of this modified window technique using PVS impression materials for final impression of flabby maxillary ridge in the fabrication of complete dentures.

Interestingly in the completed denture, gold occlusal surface was used for the posterior acrylic teeth. As the denture was occluding opposite natural teeth, this measure was employed to minimize the occlusal wear of conventional acrylic denture teeth (Imbery et al., 1993).

4. Summary

For flabby ridge impressions, light body impression materials produce minimal tissue displacement however there uniform and controlled application is sensitive to operator technique. A modified window technique described in this report

demonstrates an effective way for controlled application of light body PVS impression material, for a non-displacing final impression of flabby ridge. This technique can be also used with other materials such as impression plaster, which can be poured through the venting holes but may require undercuts in PVS impression material for retention.

Conflict of interest

None declared.

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