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## Management of the flabby ridge using a window technique with monophasic polyvinyl siloxane elastomeric impression material

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### Abstract

Flabby ridge is a common clinical finding affecting the alveolar ridges of the maxillary or mandibular 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, ridge 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 case report is to present a window technique for the impression of anterior maxillary flabby tissues with the use of monophasic polyvinyl siloxane impression material.

**Keywords:** Flabby tissue, fibrous tissue, window technique, monophasic polyvinylsiloxane impression material.

### 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) [10]. 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) [26]. 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) [8, 20, 30]. 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) [15]. 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) [26]. According to MacEntee, support for the complete dentures is significantly compromised if the flabby ridge has more than 2 mm displacement under pressure (Bindhoo *et al.*, 2012; MacEntee, 1996) [6, 22]. 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) [20]. 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) [26]. 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; Carlsson, 1998; Xie *et al.*, 1997; Lynch and Allen, 2004; Kelly, 1972; Bindhoo *et al.*, 2012; MacEntee, 1996) [26, 30, 8, 6, 21, 20, 10, 15, 22]. 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) [9].

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; Liddlelow, 1964) [26, 9, 17]. Several impression techniques are proposed in the literature for recording flabby ridges with the minimum amount of tissue displacement (Bansal *et al.*, 2014) [5]. 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) [4, 20, 24]. There has been a lot of controversy about the most suitable impression technique for flabby ridges (MacEntee, 1996) [22], 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) [31, 22, 13, 11, 16, 7]. 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) [31, 22, 13, 11, 16, 7]. Magnusson *et al.*, [23] (Xie *et al.*, 1997) [30] 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) [23]. Similar technique was also reported by Liddlelow (Bansal *et al.*, 2014) [5]. In another study by Osborne, two different impression materials using two separate custom trays were utilized (Osborne, 1964) [25]. 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) [29]. 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) [18]. 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-oxid eugenol impression paste for the healthy denture bearing area (Watson, 1970) [28]. The purpose of this case report is to present window technique for flabby tissues with application of monophasic Polyvinylsiloxane impression material.

## 2. Case report

1. A Preliminary impression was made with alginate material using perforated edentulous stock trays.
2. A maxillary cast was poured and the flabby ridge area was marked, followed by fabrication of custom tray [spaced (2 mm), tissue stops] with two posterior handles (Fig. 3).
3. The anterior window in the marked area was outlined using bald parker no 15 before curing the tray material to facilitate removal of the window at a later stage (Fig. 3).
4. 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.
5. Border molding was performed using the conventional technique with green stick impression compound

following which a maxillary impression was made using monophasic polyvinylsiloxane impression material (Fig.4). However, border molding can be achieved by using any technique described in the literature.

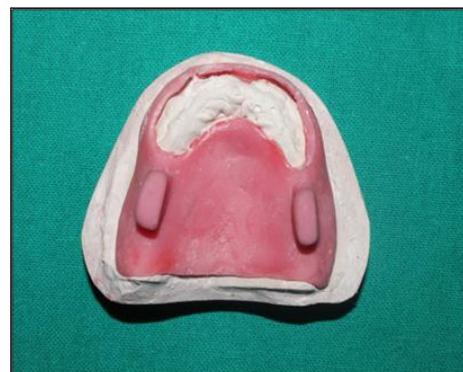
6. The impression was evaluated carefully for defects and any excess material on the periphery was removed. In addition, the impression material in the area of flabby ridge was carefully removed using scalpel blade.
7. The impression was re-seated in the patient mouth and a light body PVS impression material was injected starting from one of the side of the window to the other side (Fig.5).
8. A master cast was poured from the impression (by using Beading, boxing and pouring) and occlusal rims was fabricated for maxillomandibular relation procedure (Fig.6 (a) and Fig.6 (b)).
9. Following try-in, a maxillary and mandibular conventional complete denture was completed (Fig. 7, Fig. 8, Fig. 9, and Fig. 10).



**Fig 1:** Intra-oral view of maxillary ridge with flabby area in the anterior region



**Fig 2:** Intra-oral view of mandibular ridge



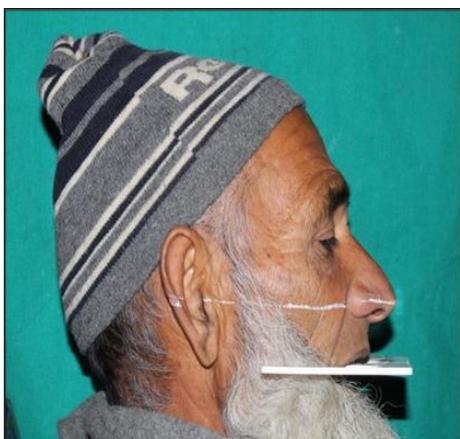
**Fig 3:** Special tray with window cut



**Fig 4:** Secondary impression recorded with monophasic polyvinylsiloxane impression material



**Fig 5:** Flabby tissue recorded with light body elastomeric impression material



**Fig 6(A):** Recording orientation of occlusal plane using fox plane



**Fig 6(B):** Recording Maxillo mandibular relation



**Fig 7:** Teeth arrangement



**Fig 8:** Try in



**Fig 9:** Denture insertion



**Fig 10:** Post operative profile photo

### 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) <sup>[26, 3]</sup>. 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) <sup>[24]</sup>. This report presents a window technique for the impression of anterior maxillary flabby ridge using monophasic 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) <sup>[29]</sup>. 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) <sup>[1, 24]</sup>. 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) <sup>[2, 27]</sup>. 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) <sup>[12, 2]</sup>. In addition, monophasic medium 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.

#### 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 window technique described in this report demonstrates an effective way for controlled application of light body poly vinyl siloxane impression material, for a non-displacing final impression of flabby ridge.

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