

Modification closed mouth functional impression technique for flabby and flat ridge: a case report

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ABSTRACT

In fabricating complete denture, flabby ridge and flat ridge require special impression technique. Pressure causes by impression in flabby ridge may compress the tissue. Ideally, modified open mouth impression technique is used to avoid compression in flabby area which cause denture base displacement. Flat ridge offers little possibility of retention, stability, and the muscle attachments are located near the crest of the residual ridge so there is more dislocating effect to horizontal and vertical movement. Closed mouth functional impression technique may produce a more retentive denture base for flat ridge because it record peripheral seal and denture bearing area with patient's functional. The main problem arises when flat ridge is also accompanied by flabby ridge. Closed mouth functional impression technique in this case cause pressure on the flabby ridge. This case report discusses about the management of the case with modification to functional closed mouth impression technique using wax as a spacer which is covered with metal mesh on the flabby ridge. The function of closed mouth functional impression technique is to obtain optimal muscle trimming and impression with patient's functional pressure and movement, to obtain the extension of the denture base to movable unmovable tissue during function. Modification with wax spacer in flabby area so that non-spacer area act as stopper during functional impression, and flabby ridge is free from pressure. Additional modification with metal mesh above the wax serves as escape holes, as well as scaffold for retention of impression material. Modification in this impression technique produce denture base which does not compress flabby ridge, and also obtain retentive, and stable base for flat ridge case.

Keywords: closed mouth, open mouth, functional impression, flabby ridge, flat ridge

INTRODUCTION

One of the most important factors in obtaining a good full denture is the adequate impression technique, that is useful for obtaining maximum support area and peripheral seal without interfering with functional movement, and accurate adaptation of soft tissue. Adequate impression to all of the support tissue of the denture bearing area will help us in obtaining denture with maximum support, as well as good retention and stability. However, these difficulties will arise when there is a compromise on the quality of the denture bearing areas such as the flabby and flat ridges, so that modifications to impression technique are necessary.¹

Various kinds of impression techniques that can be done are in the form of open mouth and closed mouth. The open mouth impression technique allows the operator to hold the custom tray and control the pressure exerted during impression. The disadvantage of this impression technique is that the pressure applied is not functional and the base extension is not in accordance with the limit of functional movement of the patient so that the possibility of under extension on the peripheral part of the denture base is possible. In the closed mouth impression technique, the operator does not mani-

pulate the pressure applied to the custom tray, but all pressure and patient movements depend on the functional movement of the patient's mouth. The disadvantage of this technique is that it can not be performed in patients with neuromuscular disorders and the pressure on the denture base support and the extension of the base according to the functional movement of the patient's mouth.²

Flabby ridge can also be called fibrous ridge or moving ridge, which are movable tissues that are located on the superficial aspect of the alveolar ridge. Flabby ridge is often found in the anterior maxillary region and are often associated with a combination syndrome.³ Flabby ridge can cause complications such as pain or loosening of the denture overlying the tissue.¹ This condition can arise due to compression of the flabby area during impression, resulting in a base the resulting compresses the flabby area. The depressed flabby margins will experience a change in shape again, which can cause the denture to become loose.³ The basic principle needed for impress the flabby ridge is to minimize the mucodisplacive impression on the flabby area so that flabby tissue is not depressed.⁴

The flabby ridge impression technique generally uses the open mouth technique with a modi-

fied custom tray so that two different types of impression materials can be used. Magnusson et al., described an impression technique using two impression materials on a physiological custom tray using zinc oxide and eugenol on normal tissue areas and an impression plaster on the flabby area. Crawford et al., described a two-tray impression technique, the two trays are fabricated and the impression is performed with two different materials. Osborne, describing a "window" impression technique with a custom tray, "window" is created in the flabby ridge area. In this technique, mucocompressive impression is performed on areas of normal tissue with zinc oxide and eugenol on a custom tray. After setting, a low viscosity impression plaster mixture was applied to the flabby tissue through the window. After setting, all the impression are removed from the patient's mouth. Watson, revising Watt and McGregor's technique, they applied an impression compound to a modified custom tray. The thermoplastic properties of the material are then manipulated simultaneously to compress normal tissue, but avoid flabby tissue areas; then the impression is carried out by using wash impression materials and zinc oxide and eugenol.^{5,6} The problem that is found in this technique is that there is a difficulty in positioning of two custom tray. The main problem encountered in flabby ridge apart from the above difficulties is that it is not indicated for closed mouth impression technique because it can cause functional pressure on the flabby ridge area.⁵⁻⁷

Flat ridges, also called atrophic ridge, can result in them being unable to provide good resistance to vertical or horizontal movement. The main problem that often arises in flat ridges is the unstable and non-retentive dentures that can cause pain and discomfort. This condition is more common in mandibular area due to the smaller denture bearing area and limitation in the anatomical area.⁹

In managing flat ridges, various modifications to the open mouth impression technique that can be done such as admix and green all compound have been suggested to obtain satisfactory functions in denture fabrication. The disadvantage of the following technique is that it can cause discomfort to the patient due to the heat required for manipulation. The advantage of this impression technique is that it can record the functional position of the muscles in one step and it requires a shorter and more economic work time. Closed mouth techniques that can be done are functional and cock-tails. The disadvantage of these various techniques is that the operator cannot control the patient's

movements, which can cause over or under extension of the denture base. The advantage of this technique is that extension and pressure is obtained according to the patient's functional.^{8,10}

In this paper, the management of flat ridge and flabby ridge in one ridge would be discussed. The problem that arises in this case is that for obtaining a retentive denture base and optimal extension of the denture base for flat ridge, we would need a closed mouth impression technique, but this technique is contraindicated for flabby ridge because it will depress the flabby tissue. To solve this problem, the closed mouth functional impression technique was modified so that accurate denture base can be obtained, but also avoid the pressure in the flabby ridge. The modification is using a wax spacer and metal mesh in flabby ridge area so that during the physiologic impression there is no pressure in flabby ridge.

CASE

A 72 years old male patient came to Department of Prosthodontic Dental Hospital of Universitas Sumatera Utara with the chief complaint that his old denture was loose and it could fall out when was used for talking and eating. The patient does not have a history of systemic disease and any bad habits.

Extra oral examination (Fig.1) showed that the patient's face was ovoid and prognathic, the upper and lower lips were thick, long, and provided adequate support. The patient's left and right pupils were normal.



Figure 1A Front face; B side face

Intra-oral examination (Fig.2) showed that in the maxillary ridge, there was flat and flabby ridge in the anterior part while in the mandibular ridge there was also flat and flabby ridge in anterior part with flat ridge in the posterior margin area. The arch of the jaw was ovoid with Class III relation. The tongue was slightly larger with Wright class III. The frenulum and saliva were normal.



Figure 2 Intraoral examination



Figure 3 Radiographic examination

Radiography examination showed that there was severe resorption in maxillary and mandibular ridge (Fig.3).

The diagnosis for the maxillary ridge was fully edentulous with flabby ridge in anterior area (canine–canine); for mandibular ridge was fully edentulous with flat ridge, and flabby ridge in anterior area (canine–canine), with Class III skeletal relation.

MANAGEMENT

This case was managed with a functional close mouth impression technique without a spacer with a modified spacer with wax on the flabby areas which were covered with metal mesh.

The procedure for making a custom tray was 1) draw an outline of 2-3 mm above the mucobuccal fold; 2) do a blocking out of the undercut area, as well as adding a 2 mm of wax spacer on the flabby area (Fig.4), and placing the metal mesh over the spacer wax which functions as an escape hole for the light body impression; 3) making custom trays using autopolymerized acrylic resin (Fig.5); 4) followed by making a wax rim on a custom tray and wax pole on the mandibular wax rim; 5) after finishing making custom tray, record the vertical di-

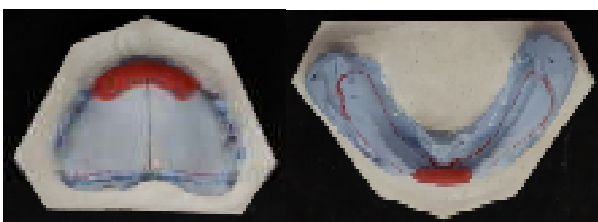


Figure 4 Spacer flabby ridge area

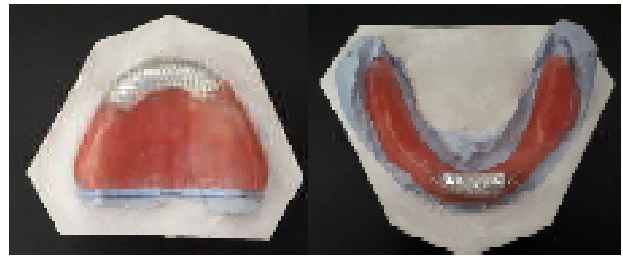


Figure 5 Custom tray with wax and metal mesh



Figure 6 Recording VD for physiologic impression

mension (VD) of the patient; 6) then proceed to border molding and physiologic impression of maxillary ridge first and was followed by mandibular ridge (Fig.6).¹¹

For maxillary border molding, adhesive agent was applied to the maxillary custom tray, then apply heavy body to the edge of the maxillary custom tray. The border molding material must cover all the edges of custom tray. After that, insert the maxillary custom tray into the patient's mouth, while a cheek retractor prevented border molding material touching the patient's lips. Then, insert the custom mandibular tray into the patient's mouth, instruct patient to cover mouth, pull the upper lip down and pull the buccal mucosa in the left premolar area inferiorly and posteroinferiorly (repeat the procedure on the right side). Instruct the patient to say "woo", "eee", and suck on the operator's finger. Finally, remove the custom tray from the patient's mouth and trim the excess area.

Procedure for maxillary physiologic impression were initiated with making an escape hole (metal mesh) in the flabby area (Fig.7A). Apply adhesive to the maxillary custom tray and apply light body material into the tray, then put it into the patient's mouth. Then, insert the mandibular custom tray into the patient's mouth, then repeat the movements made during border molding, and removing of the RA and RB custom trays from the patient's mouth, as well as trim the excess area.

Whereas procedure for mandibular border molding (Fig.7B), apply adhesive to the edge of the custom tray and apply monophasic to the retromo-

lar area to minimize deformation, and heavy body to other edges. Then, insert the maxillary and the mandibular custom tray into the patient's mouth, instruct the patient to say "woo", "eee", and instruct the patient to move the tongue to the left and right. While the patient's mouth closed, push slightly behind the tray to impress the floor of the mouth under pressure, which reflects the high contraction of the mylohyoid muscle. After that, instruct the patient to swallow, and make all movements in the oral cavity. Then, remove the mandibular custom tray from the patient's mouth, and trim excess areas on the interior of the custom tray, distal retromolar pad, and retromylohyoid fossa area.

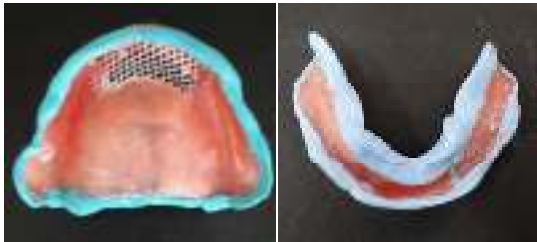


Figure 7A Escape hole in maxillary custom tray after border molding; **B** border molding in mandibular custom tray



Figure 8 Physiologic impression

The procedure for mandibular physiologic impression were make an escape hole, made of metal mesh, in the flabby area; then apply adhesive to the custom mandibular tray and apply light body material into the tray, then put it into the patient's mouth. After that, insert the maxillary custom tray into the patient's mouth, then repeat the movements made during border molding, and remove the maxillary and mandibular custom trays from the patient's mouth (Fig.8).

DISCUSSION

Modification closed mouth functional impression technique is used to manage of flabby and flat ridge. Closed mouth functional impression technique has an advantage such as the possibility of over and under extension is minimal because bor-

der molding is carried out by the patient and impression is done in occlusion position, thereby obtaining extension of the denture base to movable and unmovable tissue during function (optimal border molding) and record the ridge in functional pressure.¹² The disadvantage of this technique is that it will cause a compressibility in all the underlying structure tissue so that it is contraindicated to the flabby tissue.

To overcome this condition, a modification is made to the impression technique by placing a 2 mm wax spacer to the flabby tissue area which functions as a spacer and the area which is not covered with wax act as a stopper. In addition, other modifications are made in the form of adding a mesh coated with tin foil to the wax area, where the tin foil serves to isolate the mesh so that it is not covered with wax from the occlusal rim and the existing mesh functions as a substitute for the escape hole and acts as a scaffold to hold the impression material. From the modification of this impression technique, the selective pressure impression can be obtained, which in flabby area there is no mucofunctional pressure; but in the other tissue, mucofunctional pressure can be obtained.^{7,12} With this modification, the problem can be also solved; that is usually found in flabby impression technique such as difficulty in applying impression material in open tray technique because of the gravitational forces, and also concern of controlled application and technique sensitivity in double tray impression for flabby ridge.¹³

The advantages of this modified functional closed mouth impression technique are 1) obtaining an extension of the denture base according to the patient's function and minimized the likelihood of under or overextension of the denture base, 2) does not require double trays for flabby area impression, 3) single stage impression, and 4) easier fabrication and execution.

From this case, it can be concluded that extension of the denture base according to the patient's functional movement, denture base with functional pressure, but no pressure to flabby tissue can be obtained with modified closed mouth impression technique. It is suggested that during the impression with this technique, it is better to add light body in the mucobuccal fold area where the mesh is located to obtain a better impression.

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