

Alternative impression technique for edentulous anterior maxillary flabby tissue
Técnica de impressão alternativa para maxila edêntula com tecido flácido anterior
Técnica de impresión alternativa para mandíbula desdentada con tejido flácido anterior

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Abstract

This present study describes an impression technique to rehabilitate patients with flabby ridge in pre-maxilla through complete dentures. The proposed technique consists on the association of nondisplacive impression of the flabby area in the primary and functional impression. Therefore, a primary impression was performed with irreversible hydrocolloid with a dual impression. The impression material was removed at the region corresponding to the flabby area, characterizing a window, where a re-impression was conducted with the same material

in a more fluid consistency. The functional impression was executed with a custom tray with perforations at the flabby area fabricated over a primary anatomic cast previously relieved. As a result, an anatomic impression with reduced compression over the flabby ridge was obtained. Moreover, an accentuated decrease of the mucosa compression was obtained through the material overflow from the custom tray perforations at the functional impression. After the acrylization of the prosthetic piece, a delimited box corresponding to the flabby mucosa in the prosthesis base was verified. Thus, it is concluded that the association of techniques proposed in this study reduced the compression over the flabby ridge area resulting in a complete denture copying anatomically the flabby area at rest. Thereby, in this case through a precise negative reproduction, a more favorable retention of the maxillary complete denture was obtained in patients with flabby ridge at the pre-maxillary area.

Keywords: Flabby tissue; Impression technique; Soft tissue displacement.

Resumo

O presente estudo descreve uma técnica de moldagem para a reabilitação de pacientes com mucosa flácida em pré-maxila através de próteses totais. A técnica proposta consiste na associação de técnicas de moldagem sem compressão da área flácida, tanto na moldagem anatômica como na funcional. Sendo assim, realizou-se moldagem anatômica com hidrocolóide irreversível com dupla impressão. Sobre a região correspondente a área flácida o material de moldagem foi removido, caracterizando uma janela, e sobre esse, uma reimpressão foi conduzida com o mesmo material em consistência mais fluida. A moldagem funcional foi executada com moldeira individual com perfurações na região correspondente a área flácida, confeccionada sobre o modelo anatômico previamente aliviado. Como resultado, obteve-se na moldagem anatômica uma compressão reduzida sobre a região flácida da mucosa. Somado a isso, obteve-se uma diminuição mais acentuada da compressão da mucosa a partir do extravasamento do material de moldagem pelas perfurações na moldagem funcional. Após a acrilização da peça protética, foi verificado uma caixa delimitada correspondente à área da mucosa flácida na base da prótese. Conclui-se, portanto, que a associação de técnicas proposta por este estudo reduziu a compressão sobre a região de flacidez na mucosa de forma a resultar uma prótese total copiando anatomicamente a região flácida em seu estado de repouso. Por fim, a partir da fidelidade de uma reprodução negativa nesses casos, pode-se obter uma retenção mais favorável da prótese total maxilar em pacientes com mucosa flácida na região de pré-maxila.

Palavras-chave: Mucosa flácida; Técnica de moldagem; Deslocamento de tecido mole.

Resumen

El presente estudio describe una técnica de moldeo para la rehabilitación de pacientes con mucosa flácida en la premaxila utilizando prótesis totales. La técnica propuesta consiste en la asociación de técnicas de impresión sin compresión de la zona flácida, tanto en la impresión anatómica como funcional. Por tanto, se realizó impresión anatómica con hidrocoloide irreversible con doble impresión. En la región correspondiente a la zona flácida se retiró el material de impresión que presenta una ventana, y sobre ella se realizó una reimpresión con el mismo material en una consistencia más fluida. La impresión funcional se realizó con cubeta individual con perforaciones en la región correspondiente a la zona flácida, realizada sobre el modelo anatómico previamente relevado. Como resultado, se logró una compresión reducida en la impresión anatómica en la región flácida de la mucosa. Además, se obtuvo una disminución más pronunciada de la compresión de la mucosa por el desbordamiento del material de impresión por las perforaciones en la impresión funcional. Tras la acrilización de la parte protésica se encontró una caja delimitada correspondiente a la zona de la mucosa flácida en la base de la prótesis. Se concluye, por tanto, que la asociación de técnicas propuestas por este estudio redujo la compresión sobre la región de flacidez en la mucosa para dar como resultado una prótesis total que copia anatómicamente la región flácida en su estado de reposo. Finalmente, en base a la fidelidad de una reproducción negativa en estos casos, es posible obtener una retención más favorable de la prótesis maxilar total en pacientes con mucosa flácida en la región premaxilar.

Palabras clave: Mucosa flácida; Técnica de moldeo; Desplazamiento de tejido blando.

1. Introduction

The presence of flabby mucosa at the alveolar maxillary ridge is common in people that use a maxillary complete denture associated to removable class I mandibular partial denture. Such situation is associated with the fact that the mandibular pillars dissipates occlusal loads that traumatizes the mucosa over the superior alveolar ridge (Pai, et al., 2014; Ahmed, 2017) and accelerates the process of reabsorption in this region, therefore, presenting an unretentive and unstable maxillary complete denture. In the presence of a flabby mucosa context, the hypermobility of these tissues during the impression can provoke a distortion of the original topography at the working cast, compromising the future prosthesis adaptation (Kulkarni, et al., 2018).

Several alternative techniques of functional impressions are presented at the literature in an attempt to solve the problems regarding the ridge hyperplasia and flabbiness, providing a precise impression (Bansal, et al., 2014; Chakarvarty, et al., 2015; Rawat & Chadda, 2018). Amongst the techniques, the mucocompressive and mucostatic impressions are highlighted, using tray modifications with windows or spacers, increasing the prosthesis support, retention and stability (Lynch & Allen, 2006; Gomma & El Mekawy, 2017). The one-step impression is a technique with perforations, where the custom tray is fabricated and little spaced perforations are made at the flabby area. Then, a peripheral sealing impression with low-fusion modelling compound and an impression with elastomeric material are performed (Shum & Pow, 2014). At Watson's "Window" adapted technique, a special slice similar to a window is performed in the custom tray at the flabby area, and grooves at the edge of the tray are made to increase the impression material mechanical adhesion. Thereafter, the impression is obtained with a two-consistency elastomeric material (Kazmi, et al., 2013). The Spacer's technique, described by Singh et al. (2014), uses a custom tray obtained through wax relief with double spacers at the region with excessive mobility tissue and posterior impression with a heavy-bodied elastomeric material. The spacer at the flabby area is removed, and then perforations are made followed by an impression with a light-bodied elastomeric material.

Despite the diversity encountered in the existent techniques, the impression of the maxillary alveolar ridge is still a challenge for the professionals. This is mainly a result from the distortions of the compressed areas during the impression. The cast's excess of relief, the small space between the perforation at the custom tray and the isolated application of these techniques are characteristics that could favor the impression at rest. As a differential, this present study proposes to describe a protocol of impression of the edentulous maxilla with anterior flabby tissue associating the techniques. Therefore, first a primary anatomic impression with double impression is conducted to avoid compression of the flabby region, followed by the functional impression using an individual tray with spaced holes at the region corresponding to the flabby area. It is expected, as an alternative hypothesis, a proposed simple and fast execution technique, capable to reduce the concentration of the force and distortion when the material is compressed against the tissue at the impression moment.

2. Methodology

The present study proposes to present a technique description to edentulous patient impression protocol with an anterior maxillary flabby tissue associating two impression

techniques through a clinical case report (case study) with descriptive, exploratory purposes, with a qualitative approach, in accordance Pereira et al. (2018). Thus, according to the knowledge from clinical practice and based on the scientific literature on the topic addressed, and considering the different possibilities of conducting the case presented, it was proposed to first perform an anatomical impression with double impression to avoid compression of the anterior maxillary flabby tissue, and then a functional impression is proposed using an individual tray with perforations spaced in the region corresponding to the flabby tissue, the technique being proposed is simple and quick to perform, capable of reducing the concentration of forces and distortions when the material is compressed against the fabrics at the time of molding.

Technique

1. Verify the flabby ridge (Figure 1).

Figure 1 - Anterior flabby tissue.



Source: Authors.

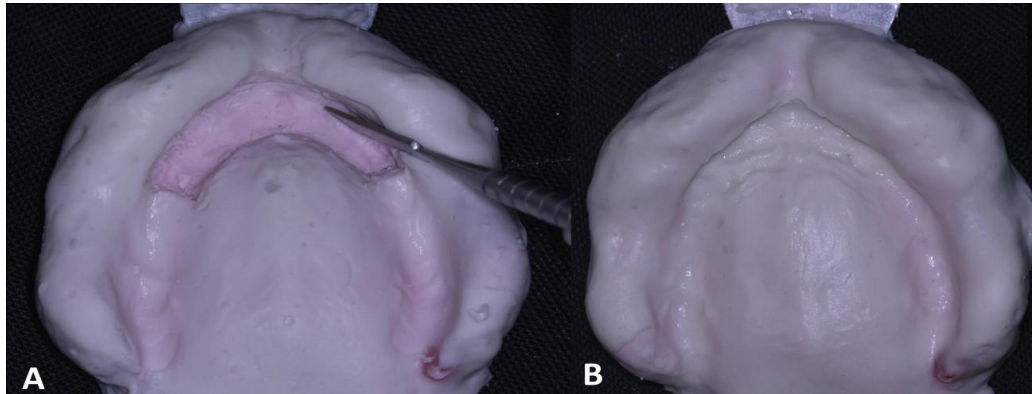
On intraoral clinical examination, it was possible to observe the flabby tissue of the anterior region of the maxilla. Figure 1 shows that the tissue was easily displaced with the aid of a dental instrument handle.

2. Perform the preliminary impression of the edentulous maxilla with irreversible hydrocolloid impression material (Jeltrate, Dentsply, Pirassununga, São Paulo, Brazil).

3. Remove a window related to the flabby ridge at the maxillary anterior region with a lecron instrument (Golgran, Millenium, São Caetano do Sul, São Paulo, Brazil) (Figure 2A). Refinement of the primary impression with alginate, proportionated with an increase of 50%

more water in volume than recommended by the manufacturer, overlaid at the previous impression (Jeltrate, Dentsply, Pirassununga, São Paulo, Brazil) (Figure 2B).

Figure 2 - Confection of a window at the flabby tissue area (A). Primary impression refined with alginate (B).

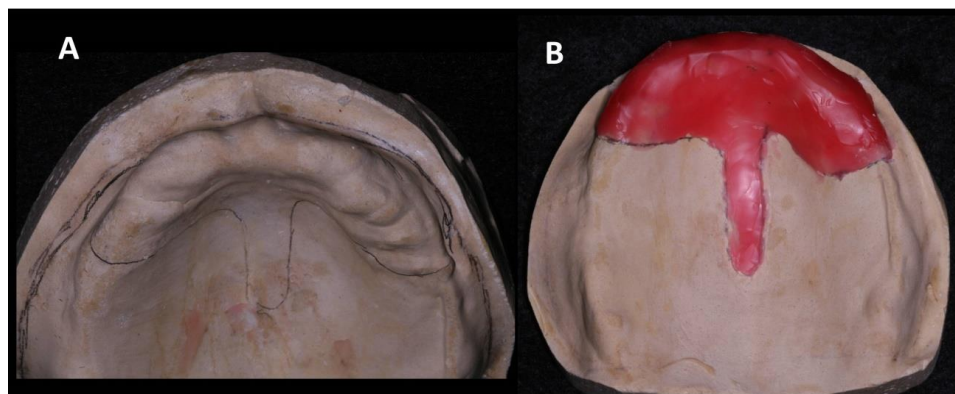


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Figure 2A shows that after obtaining the anatomical mold, a window was made in the area corresponding to the anterior flabby tissue in the maxilla with a Lecron instrument. In order to better copy this flaccid region, avoiding distortions, refinement was made with irreversible hydrocolloid with a softer consistency. Figure 2B shows the final mold obtained after performing this procedure.

4. Obtain the primary plaster cast (Figure 3A) and relieve with wax spacer 07 (Lysanda, São Paulo, Brazil) with approximately 1mm thickness at the anterior maxilla flabby ridge area (Asfer, São Caetano do Sul, São Paulo, Brazil) (Figure 3B).

Figure 3 - Primary anatomic cast flabby ridge marking at the maxillary anterior region (a). Relief made in wax spacer 07 (B).



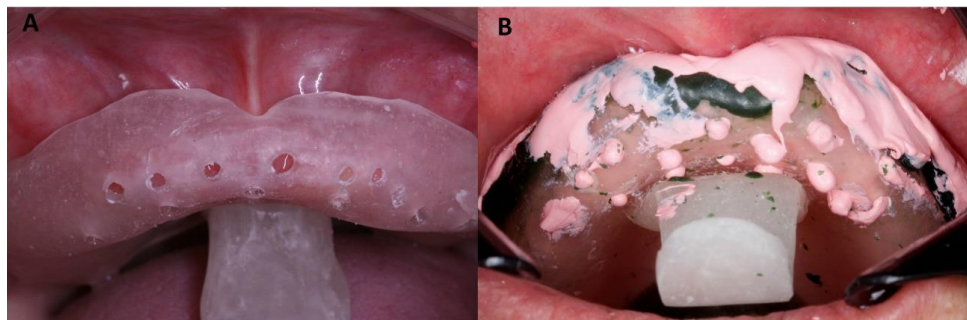
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Figure 3A shows the anatomical model obtained and the delimitation of the region to be relieved at the flabby ridge. In Figure 3B it is possible to observe the relief with wax in the region corresponding to the flabby tissue and palatine rugae.

5. Fabricate the custom tray in colorless self-curing acrylic resin (Decrilon, Dencril, Pirassununga, São Paulo, Brazil) and perform perforations with a dental handpiece (Kavo Kerr, Joinville, Santa Catarina, Brazil) in the flabby ridge area with a carbide spherical bur (2 mm diameter, Jet, São Paulo, Brazil) with 5mm of space between the holes (Figure 4A).

6. Obtain the peripheral impression with low-fusing modelling compound stick (Lysanda, São Paulo, Brazil), functional impression with zinc and eugenol paste (Lysanda, São Paulo, Brazil) (Figure 4B) and post-dam confection in wax spacer 07 (Lysanda, São Paulo, Brazil).

Figure 4 - Custom tray perforated at the flabby ridge anterior region and intraoral tray evaluation (A). Functional impression with zinc oxide and eugenol paste over the vestibule peripheral mold with low-fusing impression compound (B).

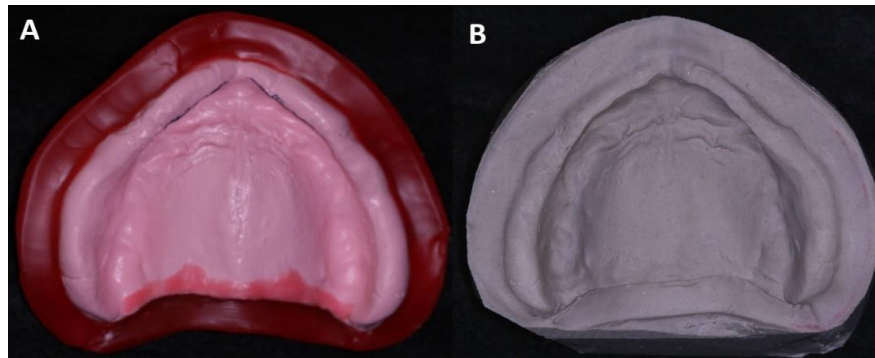


Source: Authors

Figure 4A shows the relief in the superior labial frenulum region. Perforations were performed in the region equivalent to the flabby anterior tissue to avoid distortions during the molding and copying of the tissues. In Figure 4B, after adjusting the custom tray and the peripheral seal impression, a functional impression with a zinc-enolic paste was performed.

7. Perform the beading with utility wax, 2 mm apart from the custom tray edge (Figure 5A) and obtain the functional cast in dental plaster (Asfer, São Caetano do Sul, São Paulo, Brazil) (Figure 5B).

Figure 5 - Beading with utility wax (A). Maxillary functional cast (B).



Source: Authors.

After the polymerization of the material, the mold was removed and analyzed. Figure 5A shows the beading with utility wax. This procedure is performed to protect the edges and the reproduction of the functional model. Figure 5B shows the functional model obtained after removing the functional model from the mold.

3. Results and Discussion

As a result, the alternative hypothesis of this study was accepted and a simple and fast execution technique was obtained. Moreover, the reduction of the impression materials distortions was verified in the impression of the flabby ridge. The prosthesis retention, support and stability at the ridge are intrinsically dependent of a precise impression, especially before a flabby ridge (Figure 1). At the impression time, the fibrous tissues can be dislocated and suffer compression preventing the register and precise copy of the region; hence, the impression technique is important to minimize these inconveniences (Labban, 2018). In this sense, in order to eliminate this hypermobility and distortions during the impression, some mechanisms can be applied, such as the creation of windows, micro-perforations or orifices. Such procedures decrease the pressure in the areas with flabby mucosa and reduce the alterations in position of the supporting tissues, which favors the distribution of forces over this region (Muthukumar, et al., 2012).

There are several techniques for flabby mucosa impression, one of which is the perforated impression technique. In the functional impression, an individual tray is fabricated and narrow spaced perforations are made in the area corresponding to the flabbiness. Subsequently, an impression of the peripheral seal with low-fusing modelling compound and impression with an elastomeric material are performed (Shum & Pow, 2014). As a limitation, the insertion of an accurate impression force is a subjective process that varies between

operators performing the procedure, which can result in discrepant and altered impressions. In addition, when these techniques are applied in isolated form there will be no possibility to compensate these alterations/distortions (Jain & Dhanraj, 2016).

Another technique capable of giving precision to the impression is the two-step window technique. Even though described in the literature, this technique shows difficulty in the uniform application and control of the fluid impression material. When the material is applied to the flabby tissues, it may flow through the window due to the gravity forces and maxillary positioning (Labban, 2018). Moreover, the impression obtained through this technique can result in a distorted impression. The impression material flow and displacement through the window can cause an unevenness (Muthukumar, et al., 2012). Therefore, before the aforementioned limitations and aiming to minimize them, the technique proposed in this present study is the association of the literature existent protocols. It is suggested that when these two techniques are added, the discrepancies related to the application in their isolated form can be decreased through the compensation of the association.

Initially, the window technique was performed at the primary impression, where an irreversible hydrocolloid material was used in the first step, followed by a window opening at the flabby ridge region, without its complete perforation (Figure 2A), avoiding the excessive material flowing due to the gravity. Thereafter, a refinement of the impression was made with a more fluid alginate (Figure 2B), avoiding the limitations presented by the window's original technique.

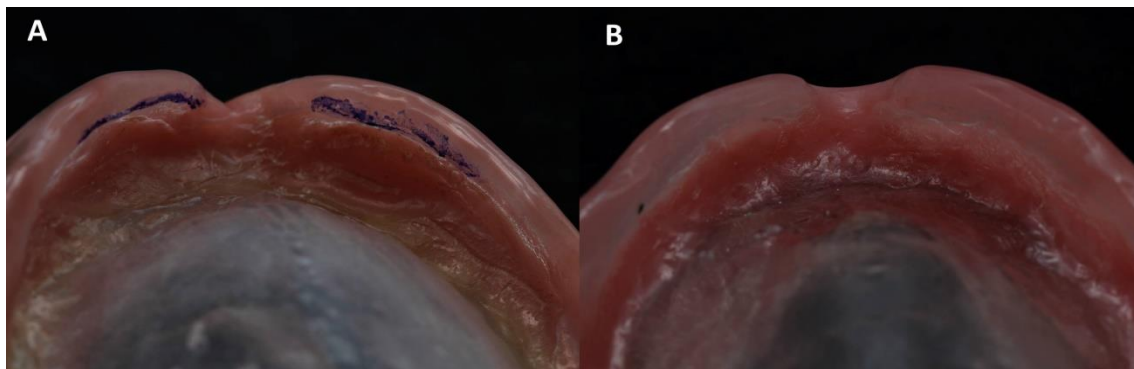
In addition to this alternative primary impression, the use of a perforated tray technique was chosen for the functional impression of the flabby premaxilla. Despite its limitations described above, the use of perforated trays for the flabby ridge impression presents an excellent alternative, since at the compression of the material at the tray there is a reduction of pressure tendency from the palate to the periphery (Komiya, et al., 2004). This indicates that the material will be able to flow beyond the central region, decreasing the forces concentration and distortions.

In regard to the perforated tray technique, the protocol applied in this study differed from the one described by Shum & Pow (2014), due to the hole size and the relief shape at the flabby ridge region. To avoid a sharp angle at the marked relief and posterior impression of the anatomy at the prosthesis base, the relief performed at the described technique was more smooth (Figure 3B). Relief reduction compared to previously described techniques became possible due to its fabrication on a precise primary anatomical cast, obtained from an impression with reduced pressure at the flabby area. Thus, the border edge was obtained

without the occurrence of sharp angles. In addition to this modification, the proposed technique modified the size and arrangement of the perforations, in which Shum & Pow (2014), performed holes with a 3mm diameter spaced from 1 to 3mm apart. In the present technique, the perforations were smaller (2mm diameter) and spaced 5mm apart (Figure 4A). The purpose of this alteration was to avoid an overflow of the impression material in order not to alter the impression of the anatomy.

From the combination of the techniques employed in this study, a delimited box of the flabby mucosa area was obtained at the acrylic prosthesis base, as observed in figure 6A, and perceived that the delimited box is not observed on previous acrylic prosthesis base (Figure 6B).

Figure 6 - Area of the prosthesis bases corresponding to the flabby ridge at the new prosthesis (A). Area of the prosthesis bases corresponding to the flabby ridge at the previous prosthesis (B).



Source: Authors

Figure 6A shows the base of the new complete denture properly copied, with well-delimited delimited spaces, showing the relevance of performing this technique for patients with flabby ridge. Figure 6B shows the patient's previous denture, with the absence of this delimited box.

The use of isolated techniques still favors the risk of obtaining excessive compressions. In conclusion, the combined use of the two pre-existing and modified techniques allowed a refinement in the impression of the flabby ridge area, which reduced the occurrence of bubbles and contributed to a smaller amount of distortions and a reliable copy of the flabby region. In addition, from the post-dam confection (figure 5A), it was possible to fabricate a prosthesis with greater stability, retention, precision and comfort for the patient.

4. Conclusion

The success of the prosthetic rehabilitation treatment is directly related to the performance of an adequate impression that provides the prosthesis support, retention, and stability. The professional must be capable to use an impression technique according to each patient profile, especially before flabby ridge cases.

Although this technique is important for obtaining well-fitted complete dentures, with support and stability, there is still a need for comparative studies with a higher level of scientific evidence that approaches the precision and efficiency of this technique in relation to others described in the literature. From this, it will be possible to assess patient satisfaction with the adaptation, acceptance, and use of new prostheses.

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