MODIFIED FUNCTIONAL IMPRESSION TECHNIQUE FOR RESORBED MANDIBULAR RIDGE: TWO CASE STUDIES

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Abstract

The highly resorbed residual ridge is the scourge of prosthodontists. Swenson stated that "the ideal ridge is one that is broad on its bearing surface and has practically parallel sides". Seldom are such ridges encountered by prosthodontists. Deterioration of this ideal ridge is frequently encountered, because of multiple factors, which may be local or systemic. Stability of lower denture in such cases is usually the distinguishing factor between success and failure [1]. Sometimes, dentists have come up with various techniques to overcome these problems in some way or the other. The static impression technique was described in 1938 by Page and subsequently by Addison, who popularized it. The technique aimed at creating an extremely accurate impression of undisturbed and uncompressed tissues. The present study describes the application of the functional impression technique in a patient with highly resorbed mandibular ridge.

Keywords: splints, obturators, viscoelasticity, functional, conditioner

1. INTRODUCTION

Tissue conditioners can be used to recover abused tissues, record functional impressions, make temporary relining for surgical splints and obturators, and for other clinical applications, mainly because of their specific viscoelasticity [2]. Their function in complete denture fabrication is debatable but their use as functional impression materials has been proved. The present article describes a technique for using tissue conditioners as functional impression materials. The correct method of usage, manipulations, the specific properties of impression materials and precautions in different situations for obtaining accurate impressions have been discussed [3,4]. Complete dentures are primarily mechanical devices but, since they function in the oral cavity, they should be harmonized with the normal neuromuscular function. Wearing of complete dentures may have adverse effects on the health of both oral and denture supporting tissues [5]. Residual ridge resorption is a complex biophysical process quite common after teeth extraction. Ridge atrophy is most dramatic during the first year after tooth loss, followed by a slower but more progressive rate of resorption thereafter [6,7]. Making a definitive impression of an edentulous arch can be challenging when the residual ridges present are too few.

Due to the anatomical differences between the maxilla and the mandible, as well as to the differences in primary and secondary load-bearing areas, impressions of resorbed mandibular ridges require special considerations [8]. Usually, mandibular residual ridges with adequate bone support can be precisely recorded with conventional impression techniques, using materials such as zinc oxide eugenol (ZOE) or elastomeric impression materials, because of their inherent accuracy and propensity to distribute pressure equally [9]. As the residual ridges are resorbed, the tissues become unsupported and displaceable; the use of conventional impression techniques will result in a distorted impression. Therefore, the impression technique needs to be modified.

Modified complete denture impression techniques using tissue conditioners of different consistencies for border moulding and final impression materials have been tested in the past.
to solve the drawbacks of the traditional methods [10]. Smutko [10] described an impression technique for resorbed residual alveolar ridge using three applications of conditioning materials of varying consistencies. Wang and Hong [11] modified Smutko’s technique to further thicken and fit the denture borders, thus improving the overall retention of complete dentures.

2. MATERIALS AND METHODS

Case report 1

A 68 year-old female patient came with edentulous maxillary and highly resorbed mandibular ridge.

1. Make the primary casts from the preliminary impressions in the conventional manner. Primary impressions are made to obtain general over-extended impressions.

2. Using the resulting cast, an activated resin tray is made, and an occlusal wax rim is added to simulate height and position of the anterior and posterior teeth and then tested in the mouth.

3. The borders are adjusted so that the lingual flange and sublingual crescent area harmonize with the resting and active phases of the mouth floor, whereas the buccal and labial extension of the acrylic tray is adjusted to be deliberately short of the reflections of cheek and lips; the retromolar pad should be covered but should show no influence from the tray, just being housed or encapsulated. A stable, non-retentive tray should be now available [12].
4. If the patient responds well to the oral instructions of the operator, the closed mouth technique can be used. Close mouth technique requires the use of a well-fitted maxillary recording base, accurate occluding rims, and an acceptable vertical dimension.

5. Generally, three applications of tissue conditioning material are used. The conditioning material used here is VISCOGEL.

Two applications of the more viscous material are made, each one remaining in the mouth for 8-10 min, then removed, rinsed and checked. Pressure areas corrected at the time of the first application usually do not appear again. The final corrective impression has a tissue placing effect, very thick and adjusted to the buccal borders, and a relatively thick lingual and sublingual crescent area.

6. The overall denture is bulkier, with more surface contact areas, than in the conventional denture. It can be considered as a mandibular denture with minimal bony contact in the alveolar ridge area, suspended in a compatible soft tissue hammock [12].
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A 65 year-old woman presented with edentulous maxillary and mandibular ridge. The procedure followed was same, except the tissue conditioning material used, which was D’SOF T.

Fig. 6. Right and left lateral view

Case report 2

A 65 year-old woman presented with edentulous maxillary and mandibular ridge. The procedure followed was same, except the tissue conditioning material used, which was D’SOF T.

Fig. 7. D’soft Tissue conditioner

Fig. 8. Mandibular and maxillary ridge

Fig. 9. Border moulding
3. DISCUSSION

When a tissue conditioner is used as a functional impression material, it should flow readily by means of functional stresses and register the accurate shape of the oral structure [13]. Although the flow property of this material would partially compensate for the dimensional changes and assure close adaptation to the denture foundation area of the clinical situation, the material with smaller dimensional changes is more adequate for functional impression making. The tissue conditioner with the least difference between the solubility and absorption percentage would show least dimensional change. Moreover, it has been shown that all tissue conditioners show least shrinkage within 8 and 24h. [14], so that a good understanding of the dimensional stability of each tissue conditioneral, an appropriate application period as an impression material and a correct selection of the material suitable for functional impressions are essential. The technique of tissue conditioner utilization as a final impression material has been described in the present article. A clinician can modify his technique to cope with various situations presented by different patients [11].

The proposed technique offers several advantages over the conventional methods of border molding and impression making.

1. As tissue conditioners are hydrophilic, they are easier to handle in oral environment, the impressions obtained being accurate and dimensionally stable. Knowing that tissue conditioners of different consistencies can impeccably adhere together, rewashing of the impression is considerably simplified [11].

2. The resulting denture has thicker and conforming buccal borders, with more surface contact area than in the conventional denture. This results in an improved retention of the mandibular denture, particularly in severely resorbed ridge cases.

3. The technique is time-saving, for both patient and clinician. In cases of complete denture, this modified technique has an additional advantage of conditioning the abused oral tissues.

In its plastic stage, the tissue conditioner responds to functional stresses to improve fit and adaptation (few hours). In the elastic stage, overall stresses are cushioned and tissue recovery takes place (few days). In the firm stage, the tissue conditioner attains dimensional stability, so that it may removed from the mouth without distortion (1-2 weeks) [15].

The most critical step in using a tissue conditioner as an impression material is that of impression pouring. Since the material shows strain rate-dependent plastic characteristics, immediate pouring of the impression is required.

A thin layer of stone can be painted over the tissue surface and borders of the impression to prevent permanent deformation caused by the
weight of the stone or by the material itself. The rest of the impression can be poured after the initial layer sets. These materials have the tendency to slump during setting so, the custom trays or the previous denture borders should be adequately supported.

4. CONCLUSIONS

A simplified technique for using tissue conditioners as a final impression material has been discussed. The technique has several advantages and is time-saving, yielding good results, being particularly useful in geriatric patients, old denture wearers, replacement of ill-fitting dentures and certain clinically-compromised situations.

References