



Recording 'Sublingual Crescents' in Lower Complete Dentures: A Technique so Effective but still Esoteric and Arcane

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ABSTRACT

Aim: To achieve retention in severely resorbed mandibular ridges during impression making and to maintain the retention and stability of these dentures during function.

Background: No good method with adequate clinical photographs that will empower the dentist with the necessary skill has been reported in the literature.

Technique: The technique involves making a preliminary impression in alginate to record the denture bearing area clearly, doing a border moulding procedure with excess width to fill the wide sulcus present; except in the area of anterior lingual flange from second premolar to second premolar area. The anterior lingual border of the impression is then extended sublingually without interfering with the tongue function or blocking the opening of the ducts of the sublingual gland; to maintain contact with the surrounding sublingual tissue in both protruded and retruded positions of the tongue, thereby creating good peripheral seal in the most vulnerable area in the lower denture, where the seal is easily broken during tongue movements.

Conclusion: This impression technique, combined with arrangement of teeth on the center of the ridge in the posterior part, use of flattened cusp posterior teeth and contoured polish surface of denture base (Fisch concept) provide sufficient retention and stability to the dentures made on these severely resorbed ridges.

Clinical significance: Patients with severely resorbed ridges cannot be rehabilitated with implants also and so normally suffer with loose lower denture fabricated with normal border moulding procedures. These patients can be rehabilitated to a great extent properly.

Keywords: Sublingual crescents, Sublingual fold, Retention, Stability, Severely resorbed mandibular ridge.

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BACKGROUND

Achieving retention and stability in a lower complete denture with a severely resorbed ridge is still a challenge for the normal dentist. In the upper denture, the labial and buccal flanges provide good peripheral seal due to lips and cheeks falling over the flanges. The vulnerable area of the upper complete denture was the posterior border area, where the peripheral seal was easily broken due to the movement of the soft palate during function. This problem was solved with the development of the methods for recording the posterior palatal seal.

Hardy and Kapur maintain that retention and stability achieved due to adhesion, cohesion and interfacial surface tension can resist only those developing forces that act perpendicular to the denture base. Horizontal forces and lateral torquing can be resisted only by adequate border seal. Terminating the denture border on soft resilient tissues will allow the mucosa to move with the denture base during function, and thereby maintain the denture seal.¹ The function of the posterior palatal seal in upper complete denture is to maintain contact with the anterior portion of the soft palate which undergoes shallow displacement during deglutition and phonation.

In the lower complete denture, the labial and buccal flanges provide good peripheral seal in the area of the lower lip and cheek which fall over it. Loss of peripheral seal frequently occurs in the anterior part of the alveololingual sulcus because of the loss of contact of the denture flange with the sublingual tissue which changes its shape along with protruding and retruding tongue movements. The loss of peripheral seal and hence loss of retention is more severe with extremely resorbed ridges, where the other factors of retention are compromised.

Recording sublingual crescents in the lower denture provides effective peripheral seal in the vulnerable anterior part of the alveololingual sulcus, resulting in excellent retention in ridges with normal or medium ridge height and satisfactory retention in severely resorbed ridges, where otherwise achieving retention is a dream.

TECHNIQUE

Materials used: No. 22 blade with no. 4 handle, impression compound rolled into sticks, low fusing impression compound, acrylic trimming burs.

1. Preliminary impression is made with alginate in a perforated edentulous stock tray to facilitate better recording of the severely resorbed ridge (Fig. 1).
2. Acrylic special tray is made without spacer from the primary cast, 36 hours before border moulding procedure to eliminate dimensional changes. Adapting a wax spacer on the severely resorbed ridge is not feasible.
3. Overextension of the special tray borders are carefully trimmed off. Borders of the tray cannot be made 2 mm short of the sulcus due to severe ridge resorption. The lip, cheek and tongue are checked with the tray in the mouth to rule out displacement due to overextension.
4. Border moulding with low fusing compound is first done in the mylohyoid, retromylohyoid and the distal extensions of the tray; initiated from one side followed by the other side. Extreme care should be taken during this step to prevent displacement of the tray. The thickness of border moulding should be more in width (approximately 3 mm) on the lingual borders. Border moulding the above areas first improves the stabilization of the tray. The labial and buccal areas are then border moulded. The thickness of these borders is also increased in width, but within functional limits; so as to enhance peripheral seal.
5. Any extension of low fusing compound into the pre-mylohyoid area is then removed.
6. Sublingual crescent recording is then initiated with impression compound sticks. Impression compound is softened carefully over a dry flame taking care not to burn out the material. The softened compound is added in layers over the borders of the tray from pre-mylohyoid area from one side to the other, finally spanning the entire anterior lingual area of the tray with the impression compound. The added compound is then tempered in hot water and premoulded to approximate shape of the sublingual crescents with the fingers. The special tray is placed in the mouth and the patient is then instructed to gently place the tongue against the lingual side of the tray handle.
7. The tray is removed from the mouth and cooled in cold water. If the extension of the sublingual crescent is inadequate, more material is added and the procedure is repeated. Properly recorded sublingual crescent bulges upward from the tray borders more than a normal border moulded border. It is approximately crescent or half spindle-shaped extending to either sides of the midline (Fig. 2).
8. The impression compound is then relieved in the frenal notch area with No. 22 BP blade, to expose the openings of the sublingual ducts. If this is not done, collection of saliva and pain occurs due to the obstruction of the sublingual gland duct openings.
9. The sublingual crescent border of the tray contacting the ventral side of tongue is examined and its borders are trimmed to remove any overextension beyond the posterior border of the sublingual fold. The light pink color of the sublingual fold than the darker pink ventral surface of the tongue acts as a guide.



Fig. 1: A badly resorbed mandibular ridge



Fig. 2: Border moulded special tray with recorded sublingual crescents (red area)

10. Low fusing compound is then carefully added along the borders of the recorded sublingual crescent in impression compound, tempered in hot water and the patient is instructed to wipe the lower lip red margins with the tongue.
11. The impression compound just behind the anterior tray handle is trimmed and shaped to remove excess.
12. The added sublingual extension now maintains contact with the sublingual fold when the tongue touches the lower lip. It also maintains contact with the floor of the mouth when the tongue is in a retracted position, thereby developing a good peripheral seal in both tongue positions.
13. The border moulded special tray is then trimmed on the tissue side to provide relief to the thin ridge throughout the tray using a bur. Extension of the low fusing compound is also removed from inside of the tray.
14. The secondary impression is then made in zinc oxide eugenol impression paste with the lip and cheek movement as usual and protruded and retracted tongue positions as described earlier (Fig. 3).
15. The cast is poured to get the master cast, with the additional positive replica of the sublingual crescent (Fig. 4).

Further alterations in methods in a sublingual recorded lower denture include the following:

- a. Adequate quantity of heat-cure acrylic resin should be used during packing procedures to compensate for the reduced ridge height and also the additional sublingual crescent area. Excess flash during trial closure of flask should be assured.
- b. Long curing cycle is preferred for polymerization of the denture to prevent porosities in the thick areas.



Fig. 3: Final impression made in zinc oxide eugenol paste



Fig. 4: Master cast made from sublingual crescent recorded impression

DISCUSSION

In case of a severely resorbed mandibular ridge, the factors affecting retention are highly compromised. Hence, the problem of achieving satisfactory retention during impression making, exist for these types of ridges. The patient finds it difficult to use dentures made in the conventional design. Implants can help to increase the retention and stability in these cases, but is a costlier option.

Extending the anterior lingual flange of the lower denture sublingually makes it possible to achieve satisfactory retention in these severely resorbed ridges (Fig. 5). But, the extension should not obstruct the movement of the tongue and ducts of sublingual gland opening in this region (Fig. 6).

ET Lewis was the first to report about the anterior sublingual area anatomy, problems and some solutions regarding what he called the genial tubercle or 'sublingual fold space' then.^{2,3}

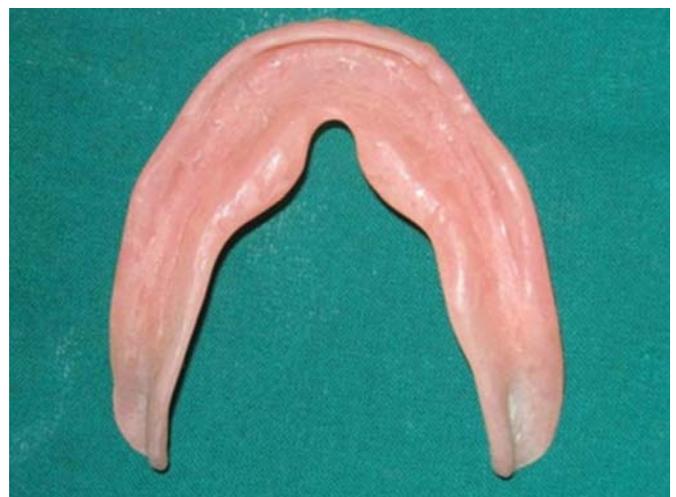


Fig. 5: Impression surface of the sublingual crescent recorded complete denture

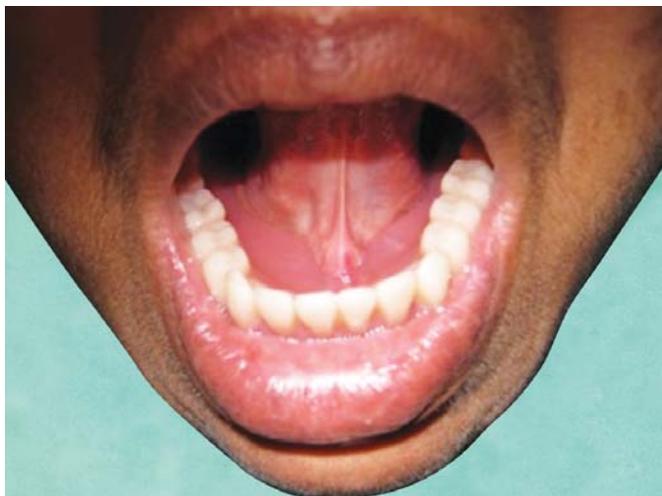


Fig. 6: Sublingual crescent recorded lower denture in the mouth showing the opening of the sublingual ducts outside the sublingual extension

Friedman⁴ has described the moulding of the anterior lingual border of the impression. Its inadequacy has been mentioned by Lawson⁵ who described in detail a technique, but no clinical photographs were presented in the publication.

M Bocage and J Leharhaupt⁶ have reported a different technique. Blockage of the submandibular salivary gland ducts due to the wide middle and posterior lingual flanges is doubted in this technique by the author, because blockage of sublingual salivary gland ducts do occur when sublingual crescents extension described were not properly relieved to expose them.

The sublingual recording technique described above follows the guidelines given by Lawson and is practiced may be by a few prosthodontics in USA and India. The author et al over a period of 6 years have noticed that recording sublingual crescents during impression making in severely resorbed mandibular ridges, combined with setting the lower posterior teeth with flattened cusps in the center of the posterior ridge in the denture and contouring of the lingual, buccal and labial flanges of the denture base (Fisch concept) provides sufficient retention and stability for the dentures made on these ridges. A similar impression technique was reported in the literature by Azzam et al.⁷

The tongue movements may be limited slightly due to the presence of sublingual crescents which the patient gets adapted, if extensions are proper. The patient can also perform functional movements of the tongue sufficiently without dislodging the denture. Overextended sublingual extensions will diminish the mandibular denture retention.⁸ Slight limitation of the tongue movement is an added benefit to maintain retention and stability in these severely resorbed ridges.

CONCLUSION

Achieving a proper shape and extension for the sublingual crescent varies with patients. In patients with highly placed genial tubercles or absence of sublingual fold space; extension of the sublingual crescent in the midline is not possible which spoils the chance of good retention. Repositioning the sublingual fold by a minor surgery followed by placing a graft³ or removing a high genial tubercle² will solve the problem.

We wish that this technique should become popular and be a part of the curriculum, like recording the posterior palatal seal in the textbooks of dental schools.

The existing procedure of recording the sublingual crescent is slightly time-consuming and the above team of authors is experimenting on a modification of the procedure to reduce the clinical time needed.

CLINICAL SIGNIFICANCE

In severely resorbed lower ridges, patients cannot be given implants as a means to increase retention. The normal border moulding procedure also cannot achieve retention in the impression and hence patients are given loose dentures as a result of which they suffer due to their inability to masticate food with it. These patients can be rehabilitated with the technique described which is not popular at present.

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