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Case Report

Improving denture retention in a resorbed mandibular ridge by recording existing Sublingual Crescent Area: A Case Report

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ABSTRACT:
Mandibular complete dentures frequently lack retention and stability and offer less denture-supporting area than maxillary dentures. In case of severely resorbed ridges retention is highly compromised. Extending the anterior lingual flange of the lower denture sublingually i.e into sublingual crescent area making it possible to achieve satisfactory retention in severely resorbed ridges. **Case report:** 75-year-old male patient had reported to the out-patient department, having complain of failed multiple denture prosthesis due to loosening of mandibular denture. Hence it was planned to incorporate additional retention aid by the incorporating maximal tissue contact within the floor of the mouth. The conventional complete denture fabrication was performed, in addition sublingual fold has been recorded. While performing peripheral tracing of the mandibular ridge, additional care was taken to record the sublingual crescent area. The same had been incorporated in the final processed complete denture to aid additional retention. After follow up of 6months period, denture showed improvement in retention and stability of the prosthesis. **Conclusion:** In compromised ridge situations, especially flat lower ridge, stability of lower denture was always been challenged. From this case report, it was seen that, a lower denture which covers the whole of available tissue bed and sublingual crescent area recorded and incorporated certainly show improved retention and stability.
Key words: resorbed mandibular ridge; sublingual crescent area; sublingual folds; denture retention.

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INTRODUCTION

Attaining 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. 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.

According to the Glossary of Prosthodontic terms, Sublingual Crescent Areais the crescent shaped area on the anterior floor of the mouth formed by the lingual wall of the mandible and the adjacent sublingual fold. Sublingual crescent extension is defined as the portion of the sublingual flange of the mandibular denture that covers the anterior region of the floor of the mouth.

CASE REPORT

A 75 year old male patient reported to the out-patient department of Department of Prosthodontics of Dasmesh Institute of Research & Dental Sciences, Faridkot, Punjab with a chief complaint of looseness of lower complete denture prosthesis. On detailed history of patient revealed that, patient had been a denture wearer for 9 years. He also gave history of unsatisfied multiple denture prosthesis. According to the clinical situation and in accordance with patient's need, a retentive denture fabrication for better and efficient mastication was put on priority.

Intra oral- examination revealed that mandibular ridge was severely resorbed Class 3 case. An attempt to fabricate another complete denture was initiated by our team. Keeping the various challenges associated with the case, clinicalsteps and treatment plan was modified to give a mandibular completedenture with sublingual crescent extension opposing a conventionalmaxillary denture.

Fig 1: Poorly resorbed mandibular foundation.

TECHNIQUE

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

1. **Primary impression:** To facilitate better recording of the severely resorbed ridge Maxillary and mandibular preliminary impression were made with impression compound(PYRAX, India)in an edentulous stock tray and primary cast was obtained.

Fig 2: Primary impression

2. **Custom tray:** Self-polymerize PMMA (PYRAX, INDIA) was used for making special tray was made without spacer, from the primary cast. Tray extension were then check in the lip, cheek and tongue area checked with the tray in the mouth to rule out displacement due to overextension. Tray were not reduced in alveololingual sulcus region to facilitate recording sublingual crescent area.

3. **Border moulding** was carried out with low fusing impression compound (DPI, Low fusing sticks)sections, first border moulding was done in the mylohyoid, followed 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. Any extension of low fusing compound into the premylohyoid area is then removed.

4. **Sublingual crescent** recording is then initiated with impression compound sticks.The softened compound is added in layers over the borders of the tray from premylohyoid 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 remoulded 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.

Fig 3: Border moulding of lower denture recording sublingual crescent area using impression compound

5. Inspection of impression revealed 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. 4). 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.

6. 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. Now 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.

7. **Wash/ Final impression** Then 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. The secondary impression is then made in zinc oxide eugenol impression paste (DPI, Impression Paste)with the lip and cheek movement as usual and protruded and retracted tongue positions as described earlier. After retrieval of impression the final/ master cast was prepared using beading and boxing method to prevent recorded tissue details.

8. **Final record base** was made with heat cure PMMA (PYRAX, INDIA) following with preparation of wax rim for tentative jaw relation were recorded, following by the teeth arrangement.

Fig 5: Final denture base

9. **Trial prosthesis** after arranging the teeth in (Monoplane Occlusion scheme) it was evaluated in patient mouth for function, stability and retention were evaluated by series of movements.

Fig 6 : Sublingual crescent in trail denture

10. Final prosthesis evaluation was fabricated using heat polymerized PMMA (PYRAX, INDIA) after finishing and polishing of the denture it was evaluated extraorally followed by intra oral examination follow up was carried after a week and next appointment was after 30 days.

Fig 7: Final prosthesis intra orally

DISCUSSION

Sublingual extension in complete dentures might be beneficial as a last resort in severely resorbed ridges asthe treatment cost of implants cannot be affordable for patients of low socio-economic status.ET Lewis was the first to report about the anterior sub-lingual area anatomy, problems and some solutions regarding what he called the genial tubercle or 'sublingual fold space' then.Increase in retention is due to extension of anterior lingual flange in sublingual space, the downward line of action of the major extrinsic lingual muscle, genioglossus, is consistent with these findings.

Overextended sublingual extension will diminish the mandibular denture retention.[1,2]. So, extensions should

be properly recorded to avail the benefits of sub-lingual area.

W. A. Lawson explained the use of sublingual folds to maintain a seal in the anterior lingual region and illustrated the tongue movements to maintain the correct downward and backward extensions of the anterior lingual border.[3]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 not feasible in every situation.Extending the anterior lingual flange of the lower denture sublingually makes it possible to achieve satisfactory retention in these severely resorbed ridges. But the extension should not obstruct the movement of the tongue and ducts of sublingual gland opening in this region.

Krammer k suggested that a normal tongue position is required to obtain the maximum possible extension of sublingual flange that will not interfere with functions of mastication, deglutition, and phonation which can be accomplished by having the patient swallow during the impression making procedures with the tongue in its normal position.[4]

Literature suggested that increase in width of sublingual region of denture could result in more retention, especially when tongue is in relaxed position.Tissues of sublingual region moves mainly in horizontal direction in normal swallowing and during function without raising sublingual gland. Since the sublingual gland is flexible and highly compressible, and floor of mouth doesn't have firm muscular support, slight distension may not create instability of denture and may improve retention.Varying degrees of extensions over the sublingual gland of each side increases the area of contact of the denture base with the tongue and glands resulting in greater effective area of the base and greater retention regardless of minor degrees of tongue retraction. The limitation of this technique is that the tongue movements may be limited slightly due to the presence of sublingual crescents, but the patient will be adapted to this, if extensions are proper.

CONCLUSION

Identifying and incorporating various physical, mechanical, anatomical and biological factors are important in an optimal success of complete denture treatment. A stable and retentive denture should be in contact with maximal underlying tissue bed. It can be said that adhesion, cohesion and interfacial tension can resist only forces that occur at a right angle to denture base (Hardy & Kapoor, 1958). An adequate border seal only can bring resistance to horizontal and lateral torsional forces.

Achieving a proper shape and extension for the sublingual crescent varies with patients.Upon successfully completing the case, it was evident that incorporation of sublingual extension into the denture base, significantly improved the retention of lower complete denture.

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