ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 4, Issue – 1, January - 2021, Page No. : 254 - 261

A Strategic Mode to Unravel Challenging Retention in Conventional Complete Dentures- A Case Report

[1]Dr Deepa Jayashankar, MDS, Reader, Deptt. of Prosthodontics, The Oxford Dental College,Bangalore.

[2]Dr Vyoma Grandhi, PG Student, Deptt. of Prosthodontics, The Oxford Dental College, Bangalore.

[3]Dr Ashish kumar , MDS, Reader, Deptt. of Prosthodontics, Ahmedabad Dental College, Gujarat

[4]Dr Malathi Dayalan, MDS, Professor, HOD, Deptt. of Prosthodontics, The Oxford Dental College, Bangalore.

[5]Dr Syed Javad Saleem, MDS, Reader, Deptt. of Prosthodontics, The Oxford Dental College, Bangalore.

Corresponding Author: Dr Syed Javad Saleem, MDS, Reader, Deptt. of Prosthodontics, The Oxford Dental College, Bangalore.

Citation of this Article: Dr Deepa Jayashankar, Dr Vyoma Grandhi, Dr Ashish Kumar, Dr Syed Javad Saleem, "A Strategic Mode to Unravel Challenging Retention in Conventional Complete Dentures- A Case Report", IJDSIR- January - 2021, Vol. – 4, Issue - 1, P. No. 254 – 261

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Rehabilitation of edentulous mandible with severely resorbed ridge often poses a clinical challenge. Due to poor quality of bone, implant may not be a viable option always. Prosthetic rehabilitation with conventional complete dentures becomes the treatment of choice owing to insufficient availability of alveolar bone. Reduced basal seat area and deprived anatomical retentive areas cause difficulty in retention of complete dentures. The sublingual crescent technique for increasing the retention of the mandibular denture is used for functional rehabilitation of patients. The extension of conventional dentures into the sublingual area can cause discomfort and soreness of the underlying tissues. A soft resilient material when used can minimize this tissue reaction and can be used as a better choice of rehabilitation. This clinical report describes in detail the prosthetic management of mandibular edentulous patient with a severely resorbed ridge with a silicone reinforced hybrid acrylic denture fabricated with medical grade silicone and semi precision attachment.

Keywords: Lower complete denture, sublingual region, silicone elastomer, acrylic denture

Introduction

Prosthodontic rehabilitation of a completely edentulous state by large has been by conventional complete denture prosthesis. A conventional complete denture is fabricated with conventional techniques, which sometimes cause patient's discomfort and dissatisfaction with the treatment. The awareness regarding the sequelae of loss of teeth and the need for immediate and continual replacement is poor in developing countries like India. This, along with several other factors results in poor denture foundation due to severe and irregular ridge resorption, often posing a

challenge for a clinician. A conventional complete denture being a removable option becomes critical as the success of the treatment depends on achieving maximum stability and retention. Recording the anatomical structure and maximizing the denture supporting surface is a prime factor to improve denture stability.

Several dental surveys have revealed that 80% of the edentulous population is able to wear both removable prostheses all the time.[1] Even though the maxillary denture with wider surface area is conducive for the patient, it is always the mandibular denture which presents with problems such as ill-fitting, denture soreness and discomfort. A dental survey revealed that 66% of the edentulous patients were dissatisfied with their mandibular complete dentures.[1]

Several authors have suggested that when there is a marked mandibular residual ridge resorption, it may be desirable to use the tongue and buccinators muscles to fix the mandibular denture in place by the appropriate design, width and form of the denture flanges.[2]

Previous literature supports thorough examination of the denture bearing area and supporting area followed by covering the maximum denture supporting surface in the impression by border molding. The most desirable border seal is accomplished by recording the functional depth of the sulcus within the physiological boundaries. Every completely edentulous mandibular ridge does not favor the ideal requirements of a denture foundation due to anatomical variations as well as ridge resorption. A knowledge of anatomical boundaries and developing different techniques to incorporate them in impression is critical to improve the stability and retention of the denture.

Case Report

A 64 year old female patient was referred to the department of Prosthodontics at The Oxford Dental College, Bangalore, Karnataka, India. The patient complained of broken lower denture 6 months ago and wanted to get it replaced. Patient was dissatisfied with the previous denture as it was loose and unsatisfactory for function. Patient presented with a medical history of hypertention since 10 years and asthma since 20 years and was on medication. Patient was deeply concerned about the esthetics and the masticatory function and indicated a desire for an appropriate solution to restore her lower denture. Patient was completely edentulous since 20 years and lost all her teeth due to rampant carious lesions. She has had 2sets of conventional dentures previously which failed to meet the demands of the patient and the treatment was unsatisfactory. Intra oral examination revealed a maxillary ridge that was square tapered with adequate bone support for complete denture and the mandibular ridge which was severely resorbed in an irregular manner with an anterior knife edge ridge (Figure 1). Since the retention of the mandibular denture was questionable in the present clinical situation, a technique to help and record the finer anatomic details to aid in retention was proposed. In this case, utilizing the anatomical variation, the sublingual crescent technique was thought to be beneficial. After evaluating the feasibility of different clinical techniques to rehabilitate, the importance of utilizing the anatomically desirable variation to aid in retention is upheld.

The lingual crescent extension is that portion of the sublingual flange of the mandibular denture that covers the anterior region of the floor of the mouth. It starts at the alveolar ridge crest and ends at the soft displacement tissue at the base of the tongue that is not directly supported by bone. Extension of the denture over the resting tissues of the sublingual crescent area completes the border seal and increases the surface area covered by

the denture, resulting in greater retention by allowing the tongue to aid in holding the denture in place.[3]

Considering this anatomy, a technique to involve the sublingual crescent for retention is explained in this case report.

A preliminary impression of both maxillary and mandibular arch was made using impression compound cake (DPI Pinnacle) in a metal stock tray. Beading and boxing of the impressions were done and were poured with dental plaster to obtain the primary casts. Custom trays were fabricated using the tray material, for the mandibular custom tray no spacer was provided. The trays were checked in the patient's mouth and were trimmed 2 mm short of the vestibule all over. After the extensions of the special trays were corrected, border molding with low fusing compound was done starting from the distolingual sulcus. The labial and the buccal areas were then border molded and the sublingual recording was initiated with impression compound. The impression compound was softened in a hot water bath (60ºC) and added over the borders of the custom acrylic tray from premylohyoid eminence of one side to the other. The added compound was then tempered in hot water bath and the custom tray was placed in the patient's mouth. The patient was instructed to gently place the tongue against the lingual side of the tray handle. The tray was removed from mouth and placed in cold water. This procedure was repeated until the sublingual crescent area was satisfactorily recorded. The impression compound was relieved to expose the frenal notch area and the sublingual duct openings. The low fusing compound was then added to the borders of the impression compound and the same movements were repeated. With this addition, the sublingual crescent area now maintains a contact with the sublingual fold when the tongue touches the lip (figure 2). It even maintains a contact with the floor of the mouth when the tongue is in a retracted position. Thus, developing a good peripheral seal. Relief holes were made in the custom tray and a secondary impression was made using zinc oxide eugenol impression paste. The maxillary border molding and the secondary impression was made in a conventional manner. Following this, beading and boxing of the impressions were done and casts were poured using dental stone (type 3 gypsum) to obtain the master cast. Temporary denture bases (self-cure acrylic resin) were made on the master casts and occlusal rims (base plate wax) were fabricated on the denture bases and maxillomandibular jaw relation was recorded. Teeth arrangement and anterior and posterior try-in was done. Once the patient was satisfied with the esthetics, phonetics and the function of the trial wax dentures, the mandibular cast was duplicated using a hydrocolloid duplicating material. The trial denture bases were sealed to the master casts and the dentures were processed using heat cure acrylic resin with compression molding technique. Once the dentures were obtained, they were trimmed and polished.

In this technique a desirable anatomical undercut of the sublingual crescent area was used to aid in retention. Placement and removal of denture using the conventional technique and material is cumbersome as the denture gets locked in the anatomical variation. This can lead to frequent frictional irritation and mucositis. A technique to incorporate medical grade room temperature vulcanized silicone, is used to gain the advantage of using the anatomical undercut and to not cause mucosal irritation was adapted.

To achieve this, the mandibular denture was placed over the duplicated master cast (figure 3) and vinyl polysiloxane of putty consistency was used to make an index of the denture. Once the index was set, the denture was retrieved and the sublingual crescent extensions of the

PMMA resin was trimmed off and the denture was placed on the duplicated master cast which was invested in the varsity flask. Room temperature vulcanized medical grade silicone was manipulated according to manufacturers' instructions, and the silicone was added on the sublingual crescent extension regions and the putty index was re-adapted over it. After 24 hours, the putty index was removed, the silicone extensions were removed and the excess was cut-off using a bard parker blade number 22 and mosquito scissors.

It is a well known fact that the bonding of silicone to acrylic resin is by mechanical means. To accomplish this, a technique to incorporate a semi-precision attachment to enhance the retention was used. Use of precision attachments in the prosthesis for retention and support is not new in prosthodontics. Though many articles support the use of these attachments in retention of overdentures and fixed partial dentures, in this article, a new technique to utilize these attachments as a part of a conventional mandibular denture is introduced. This extension of silicone into the anatomical space on the acrylic denture using this attachment has proven to be an effective method to improve retention in poor ridges for denture foundation.

In the present case report, the OT Equator cap attachment (RHEIN 83 USA, New York) (figure 4) was used. The OT Equator cap was chosen because of its appropriate dimensions to be incorporated for bonding the silicone to the acrylic. The metal housing and the soft retentive cap (pink) were attached to the acrylic portion of the denture and the male component was attached to the silicone portion of the denture with the help of cyanoacrylate dental adhesive cement (figure 5 and 6). This made the silicone extension detachable (figure 7 and 8).

The final denture thus obtained was then finished and polished and inserted into the patient's mouth (figure 9 and 10). During insertion, the extensions were trimmed in both the acrylic and the silicone portions of the denture.

Home care instructions were given, and follow-up evaluation was performed 1 day, 1 week, 1 month and followed by 6 month interval. At the time of follow up evaluation, the prosthesis was noted to be functioning well. The patient was asked to rate the level of satisfaction in relation to esthetics, comfort and function of the denture with the help of a customized visual analog scale (figure11) . The average scored for all the three evaluating factors on all the four appointments was found to be extremely satisfactory. The silicone and the acrylic portions were detachable, ensuring that the semi precision attachment was also functioning well. This even facilitated the proper cleaning of the prosthesis which was very essential.

Discussion

In severely resorbed ridges the technique used for border molding plays an important role in aiding retention and in determining the success of the treatment. The use of implants have shown to improve retention and stability of denture, however not all cases are favorable for implant placement. The importance of utilizing the sublingual crescent area for providing retention of the mandibular dentures has been long known.[3,4,5,6] The usage of sublingual crescent extension has shown to enhance resistance to dislodgement and the denture is more stable during normal tongue movements.[3] The use of this technique, requires a sound knowledge on the anatomy to select the cases suitable for this technique. Patients with degenerative changes with a small fold have shown reduced success.[7] When suitable, the use of sublingual crescent technique using readily available materials like modeling compound has shown a greater success in the treatment.[3,6,8]

The occurance of discomfort and soreness on usage of conventional denture materials (PMMA) has been long known.[9,10] In light to usage of sublingual crescent technique, the overextension of the dentures in the sublingual area add to the odds of causing soreness and discomfort. The use of silicone soft liners has been long known to minimize the trauma of underlying supporting tissues. [9,10,11] In this report, the patient has been rehabilitated by replacing the heat cured PMMA resin in the sublingual crescent extension area with medical grade RTV silicone material, in view of minimizing the trauma to the underlying soft tissues in the extension area. Moreover, the silicone component being detachable, if need be the portion could be replaced with a new silicone component without redoing the entire denture again. Since, silicone shows a tendency to support microbial growth, it is challenging and important to maintain good oral hygiene and denture hygiene as it effectively minimizes the microbial/fungal colonization of silicone and helps prolong their life. [9,10,11] In the present technique use of an attachment made the silicone extensions easily detachable by the patient helping in cleaning and can be replaced back in position to aid in retention and thereby reducing the tendency of microbial growth.

The bonding of silicone to acrylic is by mechanical means. Mechanical retentive areas in the form of grooves, beads have been used to bond silicone to acrylic resin previously.[9] However this method of retention causes accumulation of micro-organisms. Various attachments are available from different manufacturers in the form of ball-and-socket devices, primarily used for over denture retention and stabilization.[12] The use of OT Equator attachments have shown to improve the final treatment result enhancing the retention and stability.[13] The OT Equator cap attachment was used in the present clinical scenario because of its small and precise size specifications and availability. This semi precision attachment provided good retention and stabilized the position of the silicone extension. Further, it even made the silicone extension detachable, facilitating cleaning and replacement of the extension.

Summary

Severely resorbed mandibular ridges can be successfully treated by using sublingual crescent technique and replacing the conventional dentures with a hybrid form of denture incorporating silicone to acrylic resin. The main advantage of this technique being that, it not just improved the retention and stability of the mandibular dentures but also minimizes the mucosal irritation. The use of OT Equator cap improved retention of the silicone extension, and made it a removable as well as replaceable component enhancing the hygiene of the prosthesis. Thus, in time to come this clinical procedure can be favorable in unraveling the loose mandibular dentures.

References

1. Misch C E; Contemporary implant dentistry. 3rd edition; St. Louis, Missouri.
2. Brill N, Tryde G, Cantor R. The dynamic nature of the lower denture space. J Prosthet Dent 1965;15:401-18
3. Azzam MK, Yurkstas AA, Kronman J. The sublingual crescent extension and its relation to the stability and retention of mandibular complete dentures. J Prosthet Dent 1992;67:205-10.
4. Shanahan TE: Stabilizing lower dentures on unfavorable ridges. J Prosthet Dent 1962;12:420-4.

5. Lewis ET. Repositioning of the sublingual fold for complete dentures. J Prosthet dent 1958;8:22-25
6. Krammer VR. Principles and techniques in sublingual flange extension and complete mandibular dentures. J Prosthet dent 1982;47:479-482
7. Lawson A. Influence of the sublingual fold on retention of complete lower dentures. J Prosthet dent 1961;11:1038-1044.
8. Pradeep N, Devassy JP. Sublingual crescent extension: a solution for loose lower dentures- a case report. Dentistry 2015;5:295.
9. Feldman EE, Morrow RM, Jameson WS. Relining complete dentures with an oral cure silicone elastomer and a duplicate denture. J Prosthet Dent 1970;23:387-393
10. Segall BW, Glassman A. Use of a medical grade silicone adhesive as a denture liner in the treatment of idiopathic oral mucosal irritation. J Prosthet Dent 1982;47:85-87.
11. Singh K, Gupta N, Gupta R, Abrahm D. Prosthetic Rehabilitation with Collapsible Hybrid Acrylic Resin and Permanent Silicone Soft Liner Complete Denture of a Patient with Scleroderma-Induced Microstomia. J Prosthodont 2014;23:412–416.
12. Preiskel HW, Preiskel A. Precision attachments for the 21st century. Dent update 2009;36:221-227.
13. Mistry S, Ahuja S, Karani J, Bhatnagar V: Enhancing retention of over dentures with semi precision attachments-A case series. J Appl Dent Med Sci 2016;2:85-89.

Legend Figures

Figure 1: pre- operative intraoral view of mandibular ridge

Figure 2: border molding of the mandibular arch with sublingual crescent extension

Figure 3: processed acrylic denture placed on the master cast

Figure 4: OT EQUATOR CAP by RHEIN 83 (Stainless steel housing, male component, and soft retentive CAP 4.6mm diameter and 3mm length)

Figure 5: soft retentive cap within the stainless steel housing adapted into the acrylic resin denture

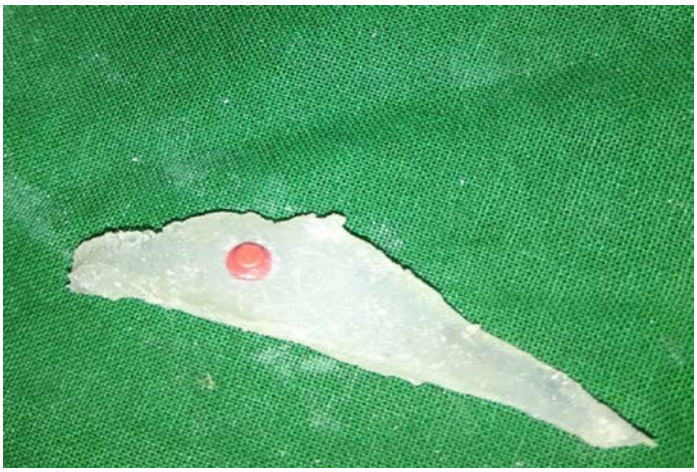

Figure 6: male component attached to the detachable silicone sublingual extension

Figure 7: intaglio surface view of the final denture

Figure 8: polished surface view of the final denture

Figure 9: intraoral view after insertion of the final denture

Figure 10: extra-oral view after insertion.