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Caramel spacer: An innovative technique for fabrication of hollow maxillary complete denture.

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Abstract: *Atrophy of the residual alveolar ridge in completely edentulous patients poses a clinical challenge to a prosthodontist. The condition leads to an increased interarch space which results in the fabrication of a heavy prosthesis. This calls out for an approach that will ensure the success of the prosthesis with better retention, stability, esthetics and the masticatory efficiency. One solution to the above problem is the fabrication of a hollow maxillary denture. In the literature, many techniques have been mentioned for the fabrication of a hollow denture. The techniques used earlier had some of the disadvantages which needed to be overcome. Thus, this case report describes a simple, unique and precise method for the fabrication of a hollow maxillary denture using a caramel spacer. The technique offers ease in retrieval of the caramel spacer through a small exit hole, thus creating a hollow cavity and producing a light weight maxillary complete denture. It allows for better retention and stability of the denture as well as enhanced comfort for the patient.*

Key Words: *Increased interarch space, Hollow maxillary denture, Caramel spacer, Light weight denture.*

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I. Introduction

Prosthodontic rehabilitation of a patient with completely edentulous ridges aims to alleviate the anatomical and functional deficiencies present especially in patients with resorbed or atrophic ridges.[1] It is a challenging task to rehabilitate resorbed ridges as well as achieving adequate retention and stability of the denture in such cases.[2] Increased interarch space adds to the weight of the denture affecting the stability of the prosthesis, and thus, this problem needs to be addressed.[3]

A Prosthodontist must use specialized training and prosthetic abilities to overcome the above stated problem with simple techniques. To decrease the leverage and provide a stable denture, reduction in the weight of the prosthesis would be beneficial (Brown, 1969; el Mahdy, 1969).[4] Also, to increase the retention and stability of a heavy prosthesis, fabrication of a hollow denture has been tried.[5]

Numerous materials for hollowing the denture have been used and mentioned in the literature like using a solid 3D spacer, including dental stone, cellophane-wrapped asbestos, silicone putty, modelling clay, and thermocol during the laboratory processing to exclude denture base material from the planned hollow cavity of the prosthesis.[1,4–10]

There are two techniques that exist in the literature to achieve a hollow prosthesis. Some techniques use one flask to fabricate the whole prosthesis while others have used techniques that require two flasks to fabricate the prosthesis in two separate halves.[2,11] According to the literature, both the above techniques have some advantages and disadvantages.

This case report describes a simple, unique and precise method for the fabrication of a hollow maxillary denture using a caramel spacer. The technique offers ease in retrieval of the caramel spacer through a small exit hole, thus creating a hollow cavity and producing a light weight maxillary complete denture. It allows for better retention and stability of the denture as well as enhanced comfort for the patient.

II. Case report

A 75 year old male patient reported to the Department of Prosthodontics with the chief complaint of loosening of his existing upper denture and difficulty in mastication. History revealed that patient was edentulous for past 20 years and had used many sets of complete dentures. On examination, it was found that

both maxillary and mandibular ridges were resorbed, (Fig. 1) the inter-ridge distance was 24 mm which was more than normal. The previous denture of the patient had worn out teeth and was not retentive. Hence, it was decided to make a new set of denture for the patient. In this patient, implant supported complete denture was not possible due to poor bony foundation and financial constraints.

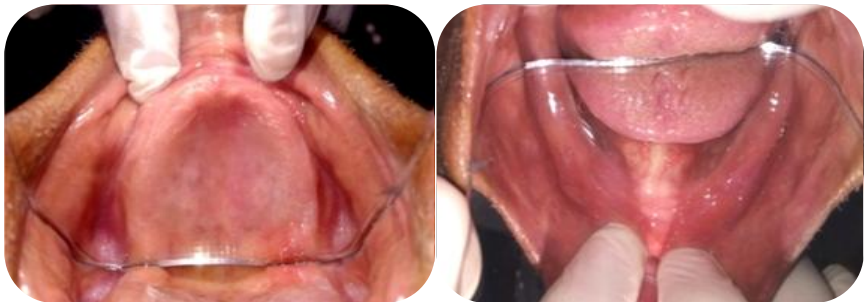

Fig. 1: Resorbed Edentulous Maxillary And Mandibular Arch

So, it was decided to make a hollow conventional maxillary complete denture and a mandibular denture considering the patients age. The patient also approved of the treatment as it was light in weight, inexpensive and non-surgical procedure.

Technique:

- The conventional steps for complete denture fabrication were done till the stage of try – in. After the try – in appointment, the waxed denture was flasked and de-waxed in the usual manner (Fig. 2). Then on the definitive cast in the base flask sheet of modelling wax of 1.5mm thickness was adapted. (Fig. 3)

Fig. 2: Maxillary Trial Denture Flasking

Fig. 3: Modelling wax applied on master cast

- Two cylinders of 2mm in diameter and 5mm in length were made using autopolymerising resin and two retentive grooves were made on the intaglio surface of the 2nd premolar of both sides. The resin cylinders were then attached to these grooves using cyanoacrylate resin. Care was taken to position these cylinders perpendicular to the teeth and along the path of closure of the flask. Purpose of the cylinder is to act as stoppers and orientation points for the 3Dimensional spacer. (Fig. 4a and b)

Fig. 4 (a): Autopolymerising resin stopper (5 mm height) to prevent spacer movement while packing; (b) Autopolymerising resin stoppers attached to intaglio surface of 2nd premolar on both sides

- A layer of modelling wax (approximating to 1.5mm of thickness) was adapted on the intaglio surface i.e., on the acrylic binding surface of the teeth to mimic the final thickness of acrylic resin that is going to be there in the final denture. This will lead to exposure of the stoppers by 3.5mm. (Fig. 5)

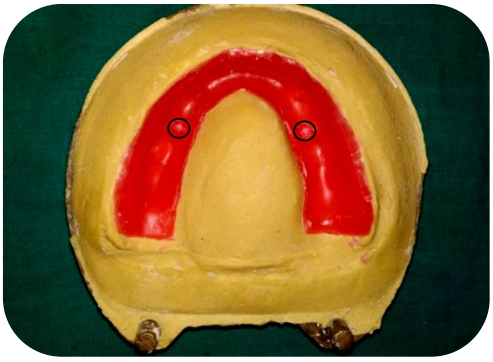

Fig. 5: Modelling wax to mimic the final thickness of acrylic resin with the stoppers exposed

- The base flask with adapted modelling wax and counter flask with attached stoppers and modelling wax were checked for accurate closure. Into the space that is available between the base and counter flask the addition silicone putty was mixed and adapted and the flasks were closed. Until the putty polymerises, clamp pressure was maintained. (Fig. 6)

Fig. 6: Addition silicone putty adapted into the space available

- After opening the flask, putty was removed and the excess was trimmed. Putty was replaced and the flask was closed. Accurate fit of the putty spacer was verified by complete flask closure. (Fig. 7)

Fig. 7: Putty 3D spacer in position.

- The 3D putty spacer was then coated with petroleum jelly and a putty wash index of this 3D spacer was made using putty and light body addition silicone. Care has to be taken that the spacer is embedded upto the borders and the light body should flow into the indentations of the spacer to mimic the resin stoppers. (Fig. 8a and b)

Fig. 8 (a) 3d putty spacer with indentations for resin stoppers; (b) Duplication of 3D putty spacer

- As wax was adapted onto the cast and intaglio surface of the teeth both the base and the counter flask were dewaxed and a layer of separating media was applied on both.
- After the polymerisation of the putty wash index, 3D putty spacer is carefully removed.
- To prepare caramel, sugar is heated in a stainless steel bowl on an open flame at a temperature of about 180 to 250°C. Intermittent stirring should be done while doing this so that the sugar doesn't get burnt. The liquid caramel is then poured into the index and allowed to cool.
- The caramel spacer after cooling is carefully removed from the putty index and its fit is verified by placing it in the flask on the autopolymerising stoppers. (Fig. 9a and b)

Fig.9 (a): identical caramel and 3D putty spacer

Fig. 9(b) Putty spacer replaced by caramel spacer

- After ensuring that the flask closes properly on placing the caramel spacer, mix heat polymerising acrylic resin and pack ensuring orientation of the caramel spacer onto the stoppers. Close the flask and cure the denture in conventional manner. (Fig. 10)

Fig. 10: Packing of the denture using heat polymerising acrylic resin

- Processed denture is retrieved and an opening of 2mm diameter is made distal to the last tooth on. The denture is kept in water overnight for dissolution of caramel spacer. (Fig. 11a and b)

Fig. 11 (a) Processed denture; (b) dissolution of caramel spacer by immersion in water.

- The denture is removed from water and the cavity is air-dried. The opening is sealed with autopolymerising resin. It is polished and the integrity of the seal is verified by immersing the denture in water (fig.12).

Fig.12: Floating denture confirming a completely sealed Hollow cavity

- The denture was then inserted in patient's mouth.(Fig. 13).

Fig. 13: Denture insertion in patient's mouth

III. Discussion

The method described above has several advantages over the techniques which were previously described for the fabrication of a hollow denture. Most of the methods described in the literature were either done using two flasks method which is time consuming and technically demanding.[11] Some clinicians used technique for fabrication of hollow complete denture using catheter and orthodontic wires.[5]

In other methods auto or heat-polymerizing resins have been used to join the two parts of the prosthesis that have been fabricated separately. In these techniques, the junction becomes a weak site and is prone to fracture. Also, the junction creates a site of potential leakage, which may cause seepage of fluid into the denture cavity.[8]

In the above-mentioned technique, a single piece, heat-polymerized hollow denture was fabricated with slight modifications at the time of packing, resulting in a denture with minimal adjustments at the time of insertion, minimal chance of leakage, and uniform thickness of acrylic resin around the cavity.

The thickness of the acrylic resin can be controlled due to the precise placement of the spacers, which are indexed to fit onto the acrylic stoppers. Without an "indexed" spacer there are chances of movement of the spacer in the cavity at the time of packing, which may lead to non-uniform thickness or perforations of the surrounding acrylic. The placement and orientation of the stoppers dictate the placement of the spacers and thus the accuracy of the hollow space. This particular factor was found to be missing in the literature.[2]

Caramel is used as a spacer in this case because it can be shaped as needed, it becomes hard as soon as it cools down, does not adhere to or interact with acrylic resin and can be retrieved from the putty index.[2] Caramel without any additive was used in this technique as a 3D spacer. As caramel is completely soluble in water, immersion in water is adequate to completely eliminate it from the hollow cavity. The only precaution that must be taken is to prevent water contamination while packing. The ease with which caramel dissolves in water makes it imperative that it should not be exposed to water throughout the process. Additionally, the operator has to be cautious, as solid caramel is brittle and therefore should be handled with care.

IV. Conclusion

Techniques to fabricate a maxillary hollow denture have been tried in the past, which accompanied certain disadvantages. The method in present case report overcomes them and offers for a more precise and unique way to fabricate hollow denture using caramel spacer.

References

[1]. Caculo SP, Aras MA, Chitre V. Hollow Dentures: Treatment Option for Atrophic Ridges. A Clinical Report: Hollow Dentures: Treatment Option for Atrophic Ridges. J Prosthodont. 2013;22(3):217–22.
[2]. Bhushan P, Aras MA, Chitre V, Mysore AR, Mascarenhas K, Kumar S. The Hollow Maxillary Complete Denture: A Simple, Precise, Single-Flask Technique Using a Caramel Spacer: Hollow Maxillary Complete Denture Using Caramel. J Prosthodont. 2019; 28(1):13–7.
[3]. Kaira L, Dabral E. Hollow maxillary denture: A new modified technique for improving retention in resorbed maxillary ridges. SRM J Res Dent Sci. 2014;5(1):51.
[4]. Chaturvedi S, Verma AK, Ali M, Vadhvani P. Hollow Maxillary Denture: A Simplified Approach. M Ali. 2012;5(2).
[5]. Fulari DS, Fulari SG, Badadare M, Chopade S. Hollow Complete Dentures: An Innovative Technique; International Journal of Contemporary Medical Research 2016; 3(9).
[6]. Bhat A. A hollow complete denture for severely resorbed mandibular ridges. J Indian Prosthodont Soc. 2006;6(3).
[7]. Holt RA. A hollow complete lower denture. J Prosthet Dent. 1981;45(4).
[8]. Radke U, Mundhe D. Hollow Maxillary Complete Denture. J Indian Prosthodont Soc. 2011;11(4).
[9]. Fattore L, Fine L, Edmonds DC. The hollow denture: An alternative treatment for atrophic maxillae. J Prosthet Dent. 1988; 59(4).
[10]. O'Sullivan M, Hansen N, Cronin RJ, Cagna DR. The hollow maxillary complete denture: A modified technique. J Prosthet Dent. 2004; 91(6).
[11]. Kaira L, Singh R, Mishra R, Jain M. Light weight hollow maxillary complete denture: A case series. J Orofac Sci. 2012;4(2).

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