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Case Report

An Innovative Approach to Hollow Maxillary complete denture using combination of Silicone Putty and Lost Salt Technique: A Case Report

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ABSTRACT:
Complete dentures attempts to alleviate the functional deficiencies along with maintaining the aesthetic requirement of the patient. However, anatomical conditions such as long lip length or vertical growth pattern when combined with severe resorption of the maxillary and mandibular ridges results in a large inter-ridge space. Rehabilitation in such cases results in the fabrication of heavy maxillary denture which comprises the denture bearing ability of the tissues. Therefore, fabricating light weight dentures increases the retention and improves the prognosis of the prosthesis. This article describes a simplified technique of fabricating hollow maxillary denture using a combination of silicone putty and lost salt technique, which ensures defined hollowness in the denture along with easy removal of the salt from the acrylised denture.
Key-words: hollow maxillary denture, long lip length, residual ridge resorption, silicon putty, lost salt technique

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INTRODUCTION:
Complete dentures are a boon to the edentulous patients who have been crippled from performing the basic yet very crucial act of chewing food. Despite the development of various modalities for prosthodontic rehabilitation such as implant supported overdentures, implant supported fixed prosthesis etc., the conventional complete dentures always remain relatively economical option, easy to fabricate and repair, and provide a level of aesthetics and function which is acceptable to many patients[1].
Maxillary and mandibular ridges tends to undergo continuous resorption with time, thereby increasing the inter-ridge space. This increase combined with the long lip length of the patient poses immense challenge to the success of the complete denture[2]. The large restorative space between the ridges results in fabrication of heavy maxillary complete denture that compounds to the poor denture bearing ability of the tissues and leads to decreased retention and support[3].
Therefore, this article describes the prosthodontic rehabilitation of an edentulous patient with long lip length combined with severely resorbed ridges using an innovative approach of fabricating hollow maxillary denture using a combination of silicon putty and lost salt technique.

CASE HISTORY:
A 65 year old man presented with the chief complaint of difficulty in chewing food due to loose upper and lower denture. He had been edentulous for 12 years and had been wearing dentures for last 11 years. Intraoral examination revealed severely resorbed edentulous maxillary and mandibular ridges with flabby tissue extending from canine to canine region in maxilla and almost entire crest of the ridge in mandible with extremely large inter-ridge space [figure 1 (a, b)]. His lip length was found to be 27mm (normal -23mm[4]) [figure 1c].

Figure 1: (a) Intra oral view of the maxillary arch (b) Intra oral view of the mandibular arch (c) Measurement of the lip length of the patient

A multi-step approach was considered for rehabilitation using a modified impression technique, neutral zone record and hollow maxillary denture using combination of silicone putty and lost salt technique.

Technique

1. Preliminary impression and border molding was done in conventional manner. Hobkirk's technique[5] was utilized for making the secondary impression using light body polyvinylsiloxane (PVS) for flabby area and medium body PVS for recording the rest of the ridge [figure 2 (a,b)].
2. The maxilla-mandibular relationship was recorded using wax occlusal rims and transferred to the articulator. Compound mandibular occlusal rim was fabricated as per McCord's technique and neutral zone was recorded[6] [figure 2 (c,d)]

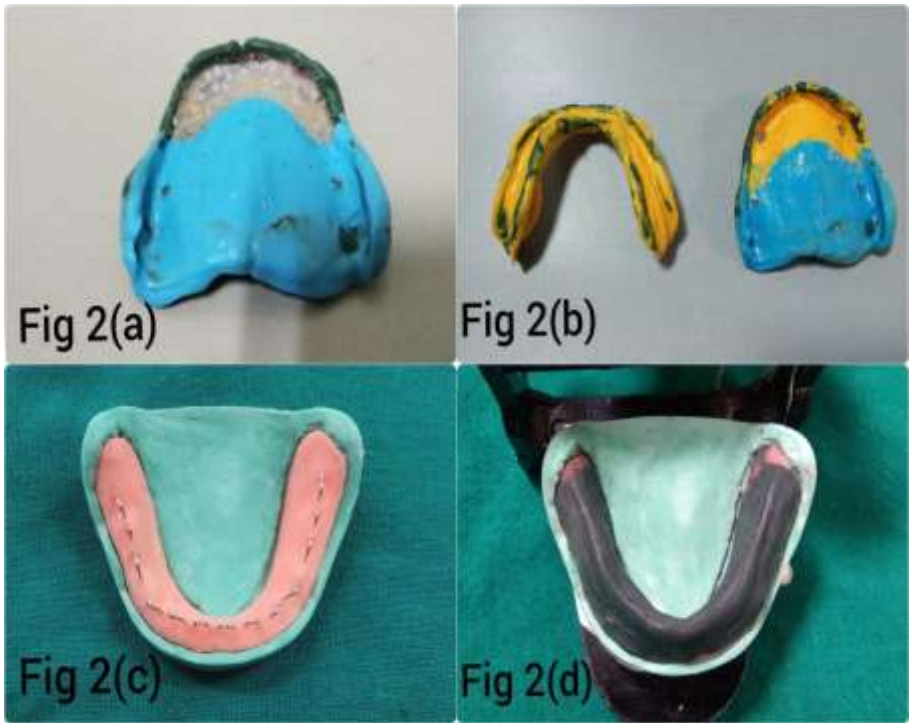

Figure 2: (a) and (b) Secondary impression using hobkirk's technique for flabby ridge (c) Mandibular denture base with retentive loops (d) Neutral zone record

3. Silicon putty index of this record was made and rims were duplicated in wax on which artificial teeth were arranged. After the try in procedure, the mandibular denture was processed in conventional method.
4. Land area of the maxillary cast was indexed and the trial denture was sealed to the cast. The trial denture was then duplicated in irreversible hydrocolloid and the impression was poured in dental stone (Kalstone, Kalabhai Karson Pvt Ltd.). A clear template was made of the duplicated cast using a 0.3-mm thermoplastic sheet [figure 3].

Figure 3: Clear template made on duplicated cast using thermoplastic sheet

5. The trial denture was processed upto the wax elimination stage. Baseplate wax was adapted to the definitive cast on the drag and acrylised with another flask using heat cure acrylic resin (DPI Heat Cure Union House, Mumbai) [figure 4 (a,b)].
6. Over the acrylised base, silicone putty (GC Flexceed Putty, GC India Dental Pvt Ltd) was adapted to the estimated outline of hollow portion of denture and secured with cyanoacrylate [figure 4c].
7. Clear template was then placed over the putty and putty was shaped to leave at least 3- 4mm space for the acrylic resin [figure 4d]. The cope of the original flask containing teeth was reseated on the drag and complete closure of the flask was verified. A cellophane sheet of 20 microns thickness was placed over the drag.

Figure 4: (a) Baseplate wax adapted to the definitive cast on the drag (b) Base acrylised using another flask (c) Silicone putty adapted onto the acrylised base (d) Estimation of acrylic thickness using endodontic file and rubber stop

8. Heat-cure acrylic resin dough was packed over the cope and trial closure was done with the putty index inside. The putty created a trough on resin dough in the cope for the salt placement [figure 5a].
9. Putty and the cellophane sheet were removed and salt was placed on the reservoir [figure 5b]. The two halves of the flask were closed and heat-cure acrylic resin was then processed as per manufacturer's instruction.

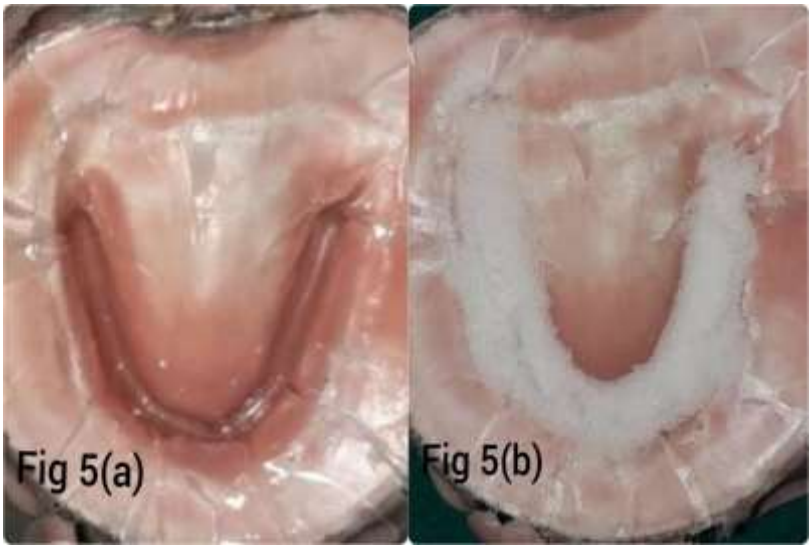

Figure 5 (a) Creation of a reservoir for salt placement on putty index removal after trial closure (b) Salt placement on the reservoir.

10. After curing, two small openings were made distal to most posterior teeth and the salt was removed by flushing water through it [figure 6a]. On complete removal of the salt, the two escape holes were closed with autopolymerising acrylic resin.
11. The seal of the hollow denture was verified by immersing the denture in water [figure 6b] and light passing through the denture confirmed its hollowness. [figure 6c].
12. The denture was inserted and instructions regarding hygiene, care and maintenance of the denture were given [figure 6d]. Periodic recall visits were scheduled to verify the retention, comfort, and function of the prosthesis.

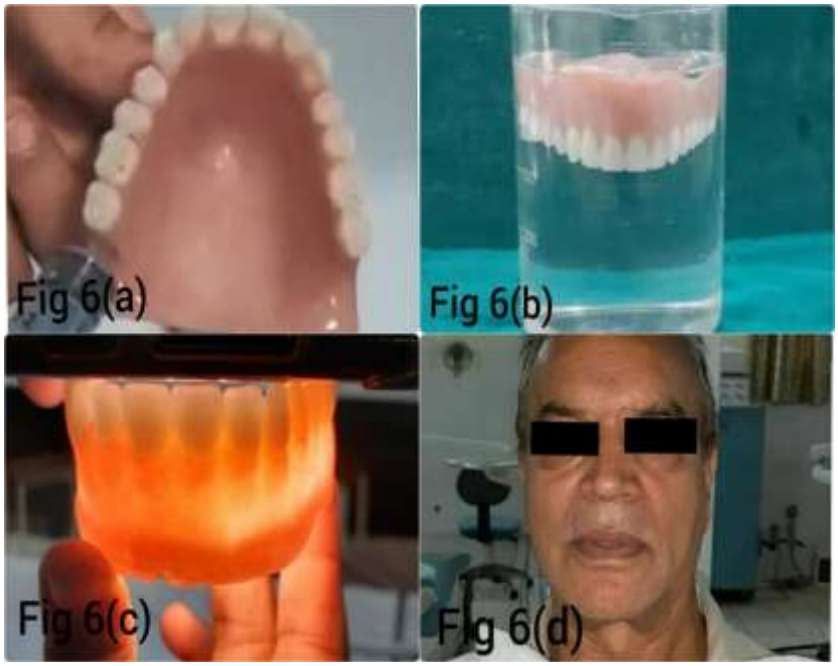

Figure 6 (a) Flushing of water for salt removal (b) Hollow denture immersed in water to verify the seal (c) Hollowness of the denture demonstrated by passing light through it (d) Post-operative view of the patient

DISCUSSION:

Complete dentures aims to restore the form and function of an edentulous patient. However, certain anatomical limitations such as long lip length or vertical growth pattern combined with severely resorbed maxillary and mandibular ridges results in large inter-occlusal space. Increased inter-occlusal space results in the fabrication of heavy dentures that compromises the denture-bearing ability of the tissues and leads to decreased retention of the prosthesis[2,3]. Therefore, reducing the weight of maxillary denture proved to be beneficial in such conditions. Various weight reduction methods have been proposed to form a solid three-dimensional spacer by using dental stone[7], cellophane wrapped asbestos[8], silicone putty[9] or modelling clay etc. to fabricate light weight denture.

The method described in this article uses a combination of silicone putty and lost salt technique. The advantages of this technique is that it surpasses the tedious task of scrapping out the putty, while the heat labile salt crystals can be easily flushed out with water. Also, the reservoir created, prevents the scattering of the salt crystals into the resin. The two openings in the cameo surface facilitates removal of salt in an area which is not frequently adjusted after denture insertion[10]. However, these modified techniques of fabricating complete dentures requires additional clinical and laboratory steps, cost and time. Therefore, the laboratory technician should be thoroughly trained to support such procedures.

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