

An Innovative Approach to Management of Severely Atrophic Maxillary Ridge with Light Weight Hollow Denture: A Case Report

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Abstract:

Successful treatment option of a completely edentulous patient depends upon three factors, retention, stability and support. Extreme resorption of residual alveolar ridge becomes more challenging procedure for clinician to rehabilitate it. Fabrication of a hollow maxillary denture can reduce the excessive weight of acrylic resin and can withstand the gravitational forces which dislodged the denture from its original position.

Key Words: Hollow denture, Atrophic ridge, Light weight denture,

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I. Introduction:

Residual alveolar ridge is defined as the portion of the residual bone and its soft tissue covering that remains after the removal of teeth.¹

In 1971 Atwood described residual ridge resorption as 'Major Oral Disease Entity' which defined as the decreasing amount of bone and form and shape of residual alveolar ridge after teeth are lost or removed.²

Residual ridge resorption is a continuous process which lead to narrower or more constricted residual ridge which include decreased supporting tissues and large inter arch space between the maxillary and mandibular residual alveolar ridge. This may result in a heavy maxillary denture that may further compound the poor denture-bearing ability of the tissues and lead to decreased retention and resistance.³

According to Howell et al, Palatal height >2 cm is regarded as high arched palate, which is associated with around 300 different conditions and can lead to a range of difficulties, including disrupted sleep caused by obstruction of the nasal passages, speech problems, and abnormalities in head and neck. The condition is also associated with dental problems later in life, such as crowding of teeth.⁴

Excessive weight the acrylic denture can compromise the retention, stability and support of the maxillary denture. The excessive weight of the maxillary conventional denture can be reduce by making it hollow, that later on prevents transmission of the unwanted and detrimental forces and thus helps to preserve the underlying bone and soft tissue which maintains the integrity of the mucosa.⁵

This case-report describes an innovative technique for fabrication of a hollow complete maxillary denture to with increased inter arch space between the maxillary and mandibular ridge and also improve the retention stability and support of the maxillary denture.

II. Case Presentation:

A 56-year-old male patient reported to Department of Prosthodontics, Divya Jyoti Dental College and Hospital, Modinagar, India with the chief complaint of difficulty in eating and speaking due to teeth loss. Dental history revealed that he had lost her teeth due to periodontal involvement and had been edentulous for last 6

years. On examination it was found that maxillary residual ridge ridges were severely resorbed (Fig1)

A thorough medical and dental history was elicited from the patient followed by clinical and radiographic examination. Treatment options discussed were pre-prosthetic surgery including ridge augmentation followed by conventional complete denture and implant-supported prosthesis. Pros and cons of all the procedures were explained to the patient. Finally he decided in favor of conventional complete denture prosthesis due to the cost involved and the surgical procedure involved in pre-prosthetic surgery and an implant supported prosthesis. After analyzing each available option, it was decided to fabricate hollow maxillary complete denture to reduce the weight of the maxillary denture to increase the retention, stability and support of the denture.



Fig 1: Pre Operative view of maxillary arch

TECHNIQUE:

Primary impression of maxillary and Mandibular arch was made with modeling plastic impression compound in a metal stock tray. The cast was poured using dental plaster and a custom tray was fabricated. Border molding of the maxilla was performed with green stick impression compound and secondary impressions for maxillary arch was performed with addition silicone light body impression material. The master casts were poured with dental stone. Acrylic denture bases were made for the master casts and occlusal rims were fabricated. After recording of maxillo-mandibular relationship both casts are mounted in an articulator. Artificial teeth arrangement was done with conventional manner and try in procedure was performed and evaluated patient's phonetics and esthetics.

After try in procedure, extra wax was reduced from palatal surface of the denture base. A thin layer (approx 1mm) of heavy body addition silicone material was placed over the palatal surface of the denture. It acts as a spacer for the hollow maxillary denture.(Fig 2, Fig 3)

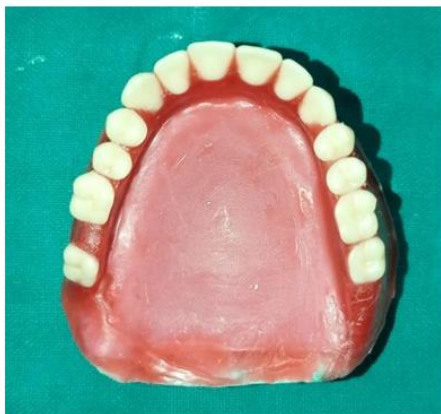


Fig 2: Extra wax was reduced from the palatal surface

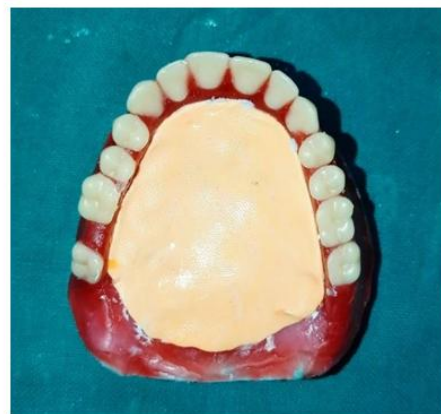


Fig 3: Thin layer of addition silicone placed over the palatal surface

During fabrication of hollow maxillary denture , interchangeable flasks were used. A thick plate of modeling wax was placed over the addition silicone impression material as it covers the palatal area. It was made for the fabrication of the second layer of denture base. (Fig 4)



Fig 4: Thick layer of modeling wax was placed over the addition silicone impression material

Addition silicone impression material was removed and cured in conventional manner. Wax palatal surface was cured separately in another flask.(Fig 5)



Fig 5: Wax palatal surface was cured in another interchangeable flask

After curing, finishing and polishing was done for both complete denture and extra layer of palatal surface. (Fig 6)



Fig 6: Final part of the complete denture and extra layer of palatal surface

Palatal plate was placed over the palatal area of the final denture and it was attached by adding auto-polymerizing resin at the junction between the palatal plate and palatal surface around the teeth. Light weight maxillary denture was verified by placing it in water and checked for any bubbles. (Fig 7, Fig 8)



Fig 7, Fig 8: Auto polymerizing resin was placed at the junction for the proper peripheral seal; Verification of the final denture was done by placing in water for bubbles

III. Discussion:

Speech is a complex physiological phenomenon resulting from respiratory, laryngeal, and resonator system interactions.⁶

Lubit studied that individuals with high or narrow palates more commonly have articulatory disorders and a hypernasal speech because of less available space for the tongue movements required for appropriate articulation.⁷

Tanaka inferred that palatal contours being crucial for the pronunciation of “S,” “SH,” and “CH” sounds were not found to be accurate in majority of constricted maxilla cases. Premature contact due to excessive thickness in anterior area can result in the “T” sounding like a “D.”⁸

Hollow denture can be fabricated by different approaches using lost salt technique, solid three dimensional spacer, cellophane wrapped asbestos, silicone putty, light-body coated gauze, thermocol, dental stone and play dough which lead to reduce the weight of the denture.^{9,10}

Fattore et al (1988), used an innovative technique for obturator fabrication by adding heat polymerized acrylic resin over the definitive cast and processing a minimal thickness of acrylic resin around the teeth using different drag. Both portions of resin were attached using a heat polymerized resin.¹¹

Holt (1981) processed a shim of indexed acrylic resin over the residual ridge and used a spacer which was then removed and the two halves luted with auto polymerized acrylic resin.¹²

In this above innovative technique, the clear resin window allows verification of the integrity of the denture at patient recall. The thickness of resin can be controlled through the use of putty and clear matrix, ensuring an even depth of resin to prevent seepage and prevent deformation under pressure of flask closure. In this technique, silicone putty was used as a spacer because it is stable, it can be carved, and it does not adhere to acrylic resin.

IV. Conclusion:

Fabrication of a Hollow maxillary denture is one of the simplest and best method of rehabilitating the patient with severely resorbed ridge. Purpose of this light weight maxillary denture is not only reduces the weight of the denture but also reduces the leverage action. It is a simple technique which allows to control of spacer thickness and by making the denture light weight making the patient more comfortable.

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