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Lightweight Prosthetic Solution: A Case Report on Fabrication of a Hollow Denture for Enhanced Retention and Comfort

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Abstract: ***Hollow denture a specialised prosthesis is given to help a patient with a severely resorbed maxillary ridge who is struggling with weight and retention. The present case report showcases the rehabilitation of a completely edentulous, elderly female patient, using a maxillary hollow denture. the patient was having difficulty with her older dentures due to lack of comfort, retention and the relative higher weight of the denture. Clinically, excessive resorption of the maxillary arch was observed to be the reason. A two-part processing method was used to create a hollow denture that is light in weight and without compromising the structural integrity. In this article, a detailed process including impression technique, vertical dimension assessment and specialized flasking procedure is discussed. The resultant denture was found to have superior clinical function due to decreased weight, increased retention resulting in an overall enhancement in patient's perception of comfort.***

Keyword: hollow denture, alveolar ridge resorption, retention, maxillary complete denture

1. Introduction

Extreme resorption of the maxillary denture bearing area may lead to problems with prosthetic rehabilitation. These may be due to narrower, more constricted residual ridge as resorption progresses, decreased supporting tissues and a resultant large restorative space between the maxillary and mandibular residual ridge[1] The dentist should use his specialized training and prosthetic abilities to overcome the above stated problems with simple techniques. To decrease the leverage, reduction in the weight of the prosthesis would be beneficial[2] Although not universally accepted, it has been suggested that gravity and the addition of weight to the mandibular complete denture may aid in prosthesis retention. Reducing the weight of a maxillary prosthesis, however, has been shown to be beneficial when constructing an obturator for the restoration of a large maxillofacial defect.[3]

Various weight reduction approaches have been achieved using a solid three dimensional spacer, including dental stone (Ackermen, 1955), cellophane wrapped asbestos (Worley & Kniejski, 1983), silicone putty (Holt, 1981) or modelling clay (DaBreo, 1990) during laboratory processing to exclude denture base material from the planned hollow cavity of the prosthesis.[3] It has also been proved that prosthesis weight can be reduced by making the denture base hollow [4] 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. [5]

In this case report, edentulous elderly female patient with increased inter-ridge distance was treated with a hollow maxillary denture, fabricated using lost salt technique which can be readily removed without any difficulty.

2. Methodology

A 56 years female patient reported to KVG Dental College and Hospital with chief complaint of missing teeth and upper and lower arch. On examination maxillary ridge were severely resorbed. Her upper lip was long, the inter-ridge distance was more and vertical dimension of occlusion (VDO) and vertical dimension at rest (VDR) were more than average.

The patient has the following choices for complete denture treatment:

a) Implant-supported complete denture
b) Conventional complete denture
c) Conventional mandibular complete dentures and hollow maxillary complete dentures.

After analysing each available option, it was decided to fabricate conventional mandibular denture and hollow maxillary complete denture. The patient also approved of the treatment modality as it was light in weight, inexpensive and non-surgical procedure.

3. Procedure

- Maxillary and mandibular primary impression was made using impression compound (DPI Pinnacle Impression Compound, The Bombay Burmah Trading Corporation Ltd.) [fig.1]
- Primary cast were pored using dental plaster. [fig,2]
- followed by border molding with green-stick (DPI Pinnacle tracing sticks, The Bombay Burmah Trading Corporation Ltd.,) and final impression with zinc oxide eugenol impression paste (DPI Impression paste, The Bombay Burmah Trading Corporation Ltd.,). [fig.3]
- occlusal rims were fabricated by using modelling wax.
- The maxilla-mandibular relationship was recorded using wax occlusal rims and transferred to the articulator. [fig. 4, 5, 6]
- artificial teeth arrangement is done. Then try in procedure was done. [fig. 7]
- After the try in procedure, wax up was done and dentures were made ready for processing.
- The mandibular denture was processed using the conventional procedures.

The Special Steps Taken for the Fabrication of Hollow Maxillary Complete Denture were as follows:

- The maxillary trial denture was flasked and dewaxed in the conventional manner. [fig. 8,9]
- Half of the heat cure PMMA (Trevalon, Dentsply India Pvt. Ltd., Gurgaon, India) in dough stage was positioned accurately over the dewaxed mould and then salt crystals were placed over it. [fig.10,11]
- Above that, the remaining heat cure resin was packed and cured.
- Cured denture was retrieved and 2 holes were made in the thickest area.
- All the residual salt crystals were removed by flushing water with the high pressure syringe through the holes.
- After making sure that all the salt crystals have been removed, the escape holes were closed with autopolymerizing resin.
- The hollow cavity seal was verified by immersing the denture in water, if no air bubbles are evident, an adequate seal is confirmed. [fig.12]
- The dentures were inserted in the patient's mouth and instructions regarding care, hygiene and maintainance were given. On 3-month follow up, the patient reported that she was quite comfortable with the dentures and she had encountered no problems. [fig.13,14]

4. Discussion

The method described has advantages over the previously described techniques. The salt crystals being heat labile melt during the curing procedure and thorough flushing after curing results in no crystals remaining in the denture thereby maintaining the integrity of the denture, avoiding the tedious effort to remove the spacer material from the denture. This technique of lost salt technique is simple to execute and utilizes a very cheap and easily available spacer material.[3]

Extreme resorption of the ridge whether maxilla or mandible will lead to a reduced denture bearing area which in turn will affect retention, stability and support for the complete denture. Problems that are likely to be faced may be due to narrower and more constricted residual ridge as the resorption progresses, causing reduced supporting tissue with larger restorative space between maxillary and mandibular residual ridges.[3]

Aggarwal et al.[6] described a case report of an edentulous patient with resorbed ridges where a simplified technique of fabricating a hollow maxillary complete denture using lost salt technique was used for preservation of denture bearing areas [6]. Worley et al.[7] described a technique producing a completely heat-cured acrylic resin hollow obturator using a "filler material" that was absent from the final prosthesis [7]. DaBreao et al.[8] demonstrated a new method of preparing light-cured maxillary interim hollow obturator prosthesis. [8]

Jhanji et al [9] described the technique, which was a controlled process in which the thickness of the obturator could be easily modified by adding to or shaving off the dimensionally stable silicone putty [9]. Kaira et al.[10] described two case reports of edentulous patients with resorbed ridges where a simplified technique of fabricating a light weight hollow maxillary complete denture was used for the preservation of denture bearing areas [12].

Shetty et al.[11] described a case report of an edentulous patient with resorbed ridges where a simplified technique of fabricating a light weight maxillary complete denture was used for preservation of denture bearing areas [11].Radke et al [12] in her clinical report described a simple technique of fabricating a hollow maxillary complete denture in a patient with resorbed maxillary and mandibular ridges with increased interridge distance which reduced the weight of the prosthesis and thereby enhanced the retention [12].

This method offers several advantages over previously described techniques. The heat-sensitive salt crystals melt during the curing process, and thorough flushing after curing ensures the complete removal of any residual crystals, preserving the denture's integrity. Unlike other methods, this technique eliminates the labor-intensive process of removing spacer materials manually. The lost salt technique is straightforward, cost-effective, and utilizes readily available spacer materials, making it both practical and efficient.

5. Conclusion

The hollow denture presented in this case illustrates the importance of individualizing prosthetic solutions based on clinical conditions. By adopting a hollow design, the patient's concerns related to retention and comfort were addressed effectively, resulting in improved functional and esthetic outcomes. This case reinforces the value of hollow dentures in addressing the unique challenges posed by severely resorbed edentulous ridges and highlights the importance of advanced prosthodontic techniques in delivering optimal patient care.

Research Area/Field
Prosthodontics and crown and bridge

Source of Support
Self

Conflicts of Interest
Nil

References

[1] Vadhvani P, Verma AK, Ali M. Hollow maxillary denture: A simplified approach. People's Journal of Scientific Research. 2012:47-50.
[2] Brown KE. Fabrication of a hollow-bulb obturator. The Journal of prosthetic dentistry. 1969 Jan 1;21(1):97-103.
[3] O'Sullivan M, Hansen N, Cronin RJ, Cagna DR. The hollow maxillary complete denture: A modified technique. The Journal of prosthetic dentistry. 2004 Jun 1;91(6):591-4.
[4] Negi KS, Kaira LS. Hollow maxillary denture-A new ray of hope for resorbed ridges. DHR Int J Med Sci. 2014; 5:72-8.
[5] Holt Jr RA. A hollow complete lower denture. The Journal of prosthetic dentistry. 1981 Apr 1;45(4):452-4.
[6] Aggarwal H, Jurel SK, Singh RD, Chand P, Kumar P. Lost salt technique for severely resorbed alveolar ridges: An innovative approach. Contemporary clinical dentistry. 2012 Jul 1;3(3):352-5.
[7] Worley JL, Kniejski ME. A method for controlling the thickness of hollow obturator prostheses. J Prosthet Dent 1983; 50:227-9.
[8] DaBreo EL. A light-cured interim obturator prosthesis. A clinical report. J Prosthet Dent 1990; 63:371-3.
[9] Jhanji A, Stevens ST. Fabrication of one-piece hollow obturators. J Prosthet Dent 1991; 66:136-8.
[10] Kaira LS, Singh R, Jain M, Mishra R Light weight hollow maxillary complete denture: A case series. J Orofac Sci 2012; 4:143-7.
[11] Shetty V, Gali S, Avindram SR. Light weight maxillary complete denture: A case report using a simplified technique with thermocol.J Interdiscip Dent 2011;1:45-8.
[12] Radke U, Mundhe D. Hollow maxillary complete denture. J Indian Prosthodont Soc 2011; 11:246-249.

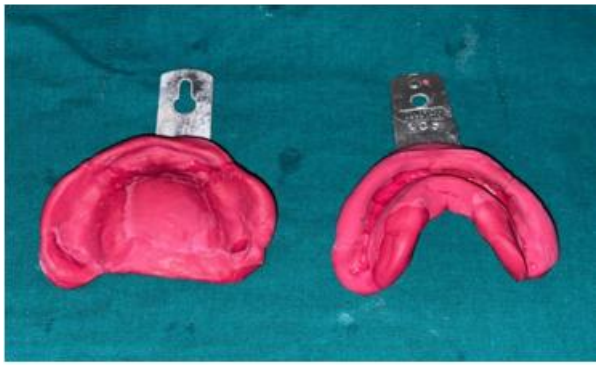

Figure 1: Primary impression

Figure 2: Primary cast

Figure 3: Border molding and secondary impression

Figure 4: Jaw relation mounted on articulator frontal view

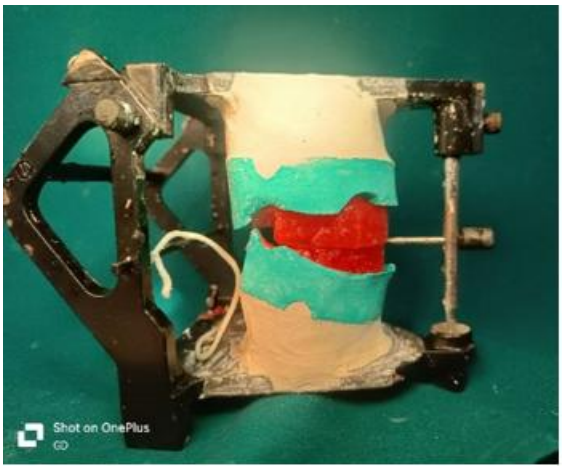

Figure 5: Jaw relation mounted on articulator right lateral view

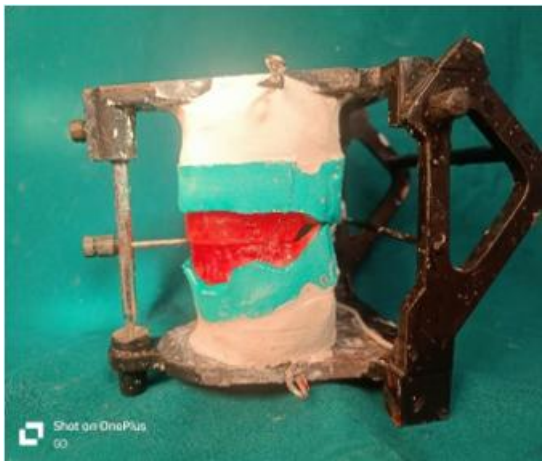

Figure 6: Jaw relation mounted on articulator left lateral view

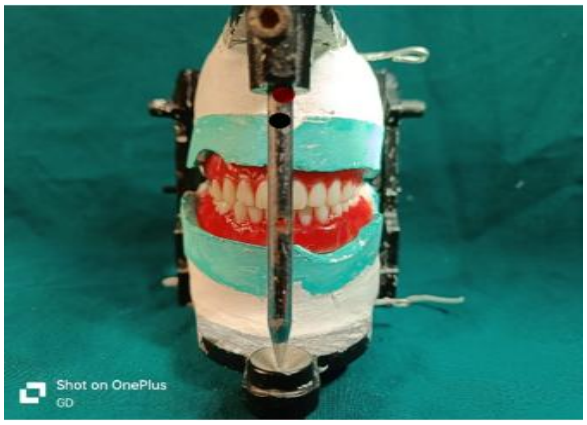

Figure 7: Teeth arrangement

Figure 8: Flasking is done

Figure 9: Dewaxing is done

Figure 10: First layer of acrylic is added

Figure 11: A layer of salt is then added.

Figure 12: Floating hollow denture

Figure 13: Pre-op

Figure 14: Post-op