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 – 5, Issue – 2, April - 2022, Page No. : 01 - 06

An Ace In A Hole: Hollow Denture In Prognathic Patient

[1]Dr.Monika M Sehgal, Professor, DAV Dental College, Yamunanagar

[2]Dr.Smriti Kapur, Reader, DAV Dental College, Yamunanagar

[3]Dr. Aman Arora, HOD, DAV Dental College, Yamunanagar

[4]Dr.Viram Upadhyaya, Reader, DAV Dental College, Yamunanagar

[5]Dr. Mansi Dahiya, PG Resident, DAV Dental College, Yamunanagar

[6]Dr.Neha Rohilla, PG Resident, DAV Dental College, Yamunanagar

Corresponding Author: Dr. Mansi Dahiya, PG Resident, DAV Dental College, Yamunanagar

Citation of this Article: Dr. Monika M Sehgal, Dr.Smriti Kapur, Dr. Aman Arora, Dr.Viram Upadhyaya, Dr. Mansi Dahiya, Dr.Neha Rohilla, "An Ace In A Hole: Hollow Denture In Prognathic Patient", IJDSIR- April - 2022, Vol. – 5, Issue - 2, P. No. 01 – 06.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

In day to day clinical practise encountering completely edentulous patient with abnormal jaw relation in adjunct with highly resorbed residual ridge is a challenging scenario. As it consequently result into compromised retention, support and stability of prosthesis. Varied material and techniques are available in literature to maximize stability in patient with abnormal jaw relation and increased inter arch space. Though, the key to success remains the same, a customised treatment planning according to the demand of the remaining oral condition. Thus this article describes a practically easy, convenient and precise technique for managing small maxillary ridge and wide mandibular ridge with high restorative space by cross arch teeth arrangement and use of novel 3D caramel spacer technique for the fabrication of hollow denture.

Keyword: Increased interarch space, Hollow denture, Prognathic, Retention, Cross arch occlusion

Introduction

In the era of advancement, the conventional complete denture is still a common choice by many practioners for geriatric patients if anatomy of residual ridge permits. Although resorption is a continuous, chronic, irreversible complex biophysical process influencing anatomic, function and aesthetics. [1] The factors as abnormal jaw relation like class II or class III with increased restorative space makes it compound troublesome to fabricate denture with adequate retention and stability.[1-2] High interarch space means heavier denture which implies rocking of denture underneath tissues due to increased amount of denture material, thus compromising stability. This is true for maxillary denture however for mandibular denture additional

weight improves retention of prosthesis by the effect of gravity.[1,3] Another factor influencing the stability of denture is occlusion which is compromised in prognathic patients due to limited available space for teeth arrangement hence creating occlusal discrepancy.[4]

To preserve what's remaining, it is imperial to manage factors which subsequently lead to resorption. Therefore achieving adequate retention, support and stability with reduced gradually resorption is critical goal for the success of the complete edentulism treatment. Previously various methods for weightless prosthesis have been employed like 3D solid space 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. Each technique pertain to their own advantages and drawbacks.[5] Similarly management of mandible prognathism involves removal of one or two bicuspid to adjust the space but that compromised masticatory unit of occlusion hence decreasing chewing efficiency. Another method to compensate discrepancy is the use of cross arch stabilising occlusion.[4] Tambe A et al[6] reported cross arch type of teeth arrangement in oral submucosa fibrosis patient to obtain stable occlusion especially in laterally deviated mandible, fortunate for stability and mastication.

This case report depicts methods to improve the stability of denture in Class III skeletal patient with high restorative space patient by cross arch stabilization of occlusion and fabrication of light weight maxillary denture using 3D caramel spacer for hollow cavity.

Case Report

A 90 year old male patient reported to Department of prosthodontics with chief complaint of loosening of his existing upper and lower denture and difficulty in chewing. Patient was completely edentulous for 25 years and worn four dentures since then. On extra-oral examination it was found facial profile is prognathic, TMJ was normal. On intraoral examination it was found mucosa was normal but with Class III ridge relation and increased inter-ridge space. The mandibular arch was wider than maxillary arch. A diagnosis of complete edentulous maxillary and mandibular arch with increased inter-ridge space and mandibular prognathic ridge relation were made. The treatment plan for the fabrication of complete denture with maxillary hollow denture and cross arch occlusal scheme teeth.

Figure 1

Figure 2

1. Maxillary and mandibular primary impression were taken with the help of irreversible hydrocolloid followed by final impression. Maxillomandibular relations (Fig1) were made using these record bases followed by articulation using the facebow and centric relation records onto a semi adjustable articulator (Hanau Wide-Vue, Whip mix)
2. The mounted cast on the articulator were evaluated for the discrepancy in the inter-ridge relations. The mandibular dental arch showed prognathic relation to maxillary arch in anterior region and cross bite that is lower ridge was more buccal to upper ridge in posterior region .
3. Teeth arrangement was done following principles of prognathic mandible along with cross arch teeth arrangement**.** The anterior teeth were arranged in an edge to edge relation and since proper teeth arrangement for posterior segment was difficult due to cross bite. Thus it was cross arch teeth were arranged after removing one bicuspid from upper arch, wherein upper posterior teeth were arranged contralateral in lower arch and visa -versa which resulted in better and stable occlusion. Patient was shown trial denture and try-in was done (Fig2). After patient's approval, wax up was done followed by preparation for hollow denture.
4. The mandibular trail denture was processed in usual manner. And for maxillary first hollow cavity was prepared as described in following.
5. **Preparation of 3D caramel spacer:**

- The investing, flasking, dewaxing of maxillary trial denture is done in conventional manner. After that 2mm wax sheet is adapted on the definitive cast in the base of flask (Fig.3)

Figure 3

Figure 4

To mimic the final uniform thickness of 3D spacer with verified accurate flask closer, the 2mm layer of modelling wax is adapted on the acrylic stopper , short of 1mm from labial, palatal and acrylic attaching surface till acrylic stoppers are exposed by atleast 2mm which is confirmed by periodontal probe (Fig.5).

Figure 5

- Once confirmed the mixed additional silicone is adapted into the space available and flask is closed and pressure is maintained until it is polymerised. Ensure correct record of indentation of the spacer and to mimic the autopolymerizing resin stopper.

Then flask is opened and putty is trimmed off same dimension as one with the modelling wax spacer to ensure uniformity and precision of 3D spacer (Fig.6).

The putty index is coated with thin uniform petroleum jelly and embedded in freshly mixed dental plaster to make mould for caramel spacer of exact same dimension as measured above. Following this, a uniform thickness 3D spacer index is obtained on dental plaster (Fig.6)

Figure 6

- To prepare caramel, a stainless steel in open flame pan is used to melt sugar which is stirred intermittently followed by pouting of liquid caramel into plaster index and allowed to cool. The caramel spacer is removed from index to check its fit into acrylic stoppers in the flask. Once it is confirmed definitive cast with modelling wax is dewaxed and prepared for final packing (Fig.7).

Figure 7

- Lastly the heat polymerised acrylic resin is mixed and packed and flasked. After polarization of maxillary denture it is recovered in usual manner, finished and polished as mandibular denture.
- Two holes are made of 3mm diameter distal to the last tooth and denture is kept in water for overnight. Denture is disinfected by betadine, air dried and sealed with autopolymerising acrylic resin. The integrity of seal is checked by immersing maxillary denture into water bowl (Fig8). Before and after insertion of denture(Fig 9). Intraorally presentation after insertion of denture as shown (Fig10).

Figure 8

Figure 9

Figure 10

Discussion

This report shows plain sailing and accurate technique to maintain maximum retention and improve stability of denture by altering the occlusal scheme to cross arch as per the patient's clinical cross bite and modifying the fabrication of hollow denture by the use 3D caramel spacer. Cross arch teeth arrangement is the technique where the upper posterior and lower posterior teeth are interchanged with each other onto the opposite sides.[4] The ability to centralise the direction of chewing forces onto the remaining residual alveolar ridge is the trump card of this occlusal scheme. It can also be used to obtain a stable occlusion in cases with the deviation of the arch more towards the lateral magnitude. However the drawback of this occlusal scheme is possible cheek bite due to the loss of buccal overlap from the upper teeth or difficulty in arrangement if the arch is too wide than expected .[2,4] Nevertheless no problem was reported in this case and patient was comfortable in follow-up visits after 6months.

Using hollow denture to reduce the weight of the prosthesis and improve stability is well documented in literature. Previously described methods[3] mostly used two flask technique in which due to two piece, the junction was more vulnerable to fracture plus the junction creates a site of potential leakage, which may cause seepage of fluid into the denture cavity thus, demanding high laboratory expertise. The above mentioned technique is a single piece, heat-polymerized hollow denture 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 plaster index used in this technique helps to orient caramel space exactly at its position and appropriate thickness. Also caramel can easily be shaped, easily soluble in water alas needed care to handle. However few precaution should be followed while using caramel that is prevent water contamination during the process of packing heat cure acrylic.[3,4] The rationale of using above mentioned hollow denture technique is the easy retrieval of caramel spacer through small exiting holes, less time consuming and technique sensitive as it makes use of single flask technique which clinically decreases the leverages and provide stable light denture.

Conclusion

The method of managing the occlusion and high interarch distance in this patient by cross arch occlusal scheme and 3D caramel spacer is a simple yet precise modification from conventional technique, like hitting two targets with one arrow. As it cumulatively improves stability as well as deduces the rate of resorption of

remaining alveolar ridge following the dictum of MM De Van, “It is more important to preserve what already exists than to replace what is missing”.

References

1. Dr. Najma Shaikh, Dr. Seema Pattanaik, Dr. Bikash Pattanaik, Dr. Anagha Sunder. Maxillary hollow denture: A literature review. Int J Appl Dent Sci 2021;7(2):517-520.
2. Goyal B, Bhargava K. Arrangement of artificial teeth in abnormal jaw relations: Mandibular protrusion and wider lower arch. J Prosthet Dent. 1974;32(4):458-61.
3. Dr. Priyanka N. Khungar, et.al. "Caramel spacer: An innovative technique for fabrication of hollow maxillary complete denture." IOSR Journal of Dental and Medical Sciences (IOSRJDMS), 19(1), 2020, pp. 31-37.
4. Abdurahiman V, Shammas M, Quassem M, JOLLY SJ. Management of Occlusion in a Completely Edentulous Patient with Abnormal Jaw Relation. Journal of Clinical and Diagnostic Research. 2019 Feb 1;13(2):7-8.
5. 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. Journal of Prosthodontics. 2019 Jan;28(1):e13-7.
6. Tambe A, Patil S, Bhat S, Badadare M. Cross-arch arrangement in complete denture prosthesis to manage an edentulous patient with oral submucous fibrosis and abnormal jaw relation. BMJ Case Rep. 2014;2014:bcr2013203065.
7. Shetty V, Gali S, Ravindran S: Light weight maxillary complete denture: a case report using a simplified technique with thermocol. J Interdiscip Dentistry 2011;1:45-48