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### RESEARCH ARTICLE

#### "SINGLE COMPLETE DENTURE WITH THE INCORPORATION OF A DENTURE TITANIUM MESH INTO THE DENTURE BASE AND METAL OCCLUSAL STOPS: A CLINICAL REPORT."

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#### Abstract

The single complete denture is a complex prosthetic treatment that necessitates a comprehensive understanding of prosthetic rehabilitation for the loss of natural dentition. One of the main challenges encountered during the provision of successful single complete denture treatment is the repeated fracture of the prosthesis. To address this issue, incorporating denture titanium mesh into the denture base is proposed as an ideal solution to strengthen the prosthesis. Another common problem is the wearing off of acrylic denture teeth when opposing natural dentition. To mitigate this issue, the use of metal occlusal stops in the single complete denture is recommended. This clinical report presents a case of successful rehabilitation of an edentulous maxillary ridge using denture titanium mesh incorporated into the heat-cure acrylic denture base material, along with metal occlusal stops in a patient with an edentulous maxillary jaw.

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#### Introduction:-

The most common clinical scenario involving a single complete denture is when an upper complete denture is present alongside lower natural teeth<sup>1</sup>. The primary objective of prosthetic treatment is to adhere to De Van's principle of "Perpetual Preservation of That What Remains rather Than Meticulous Replacement of What Has Been Lost," which holds particular significance when dealing with completely edentulous jaws opposing natural dentition<sup>2</sup>.

Koper<sup>3</sup> pointed out that occlusal problems and denture base fractures, often observed in single complete denture cases, can be attributed to one or a combination of the following factors:

1. Occlusal stresses on the maxillary denture and underlying edentulous tissue due to teeth and musculature accustomed to opposing natural teeth.
2. Inadequate alignment of mandibular teeth concerning compensatory curves and orientation planes required for bilateral balance and stability of mandibular bases.
3. Denture base flexure.

Heat polymerized denture bases are the predominant material of choice for denture fabrication, as they offer satisfactory physical, biologic, and esthetic characteristics at a reasonable cost<sup>4</sup>. However, acrylic resin denture teeth

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tend to wear down rapidly when opposed by natural teeth, porcelain, or metal restorations. In contrast, metal occlusal stops have shown clinical compatibility with opposing natural teeth<sup>5</sup>.

This case report presents a technique for fabricating a single complete denture that incorporates denture titanium mesh and metal occlusal stops to effectively oppose natural dentition.

### **Clinical Report:**

A 70-year-old male patient presented to the Department of Prosthodontics and Crown & Bridge, with a chief complaint of missing teeth in the maxillary arch. Upon reviewing the patient's dental history, it was noted that he had previously undergone fixed dental prosthesis treatment in the lower front region of the jaw. However, this treatment was followed by natural exfoliation of the maxillary teeth due to poor periodontal condition.

During the intraoral examination, a well-rounded, high maxillary edentulous ridge was observed, classified as Atwood's order I. additionally, the patient had porcelain fused to metal fixed partial denture (FPD) from teeth 32 to 45. Radiographic examination indicated a stable natural dentition in the mandibular arch.

The treatment plan formulated for the patient involved providing a single complete denture for the maxillary edentulous arch, with the incorporation of denture titanium mesh to reinforce the denture base. Furthermore, metal occlusal stops were proposed for the posterior teeth to enhance the denture's stability and occlusal function.

### **Procedure:**

1. Preliminary impressions of both the Maxillary and Mandibular arches were made using Impression compound (Esquire, MDM corp. Link, Delhi) and Irreversible hydrocolloid (Zhermak, Italy), respectively. These impressions were then invested in dental stone (Kalrock, Kalabhai Karson, India). (Fig. 1, 2)
2. A primary cast was obtained, and spacer (MAARC, Shiva Products, Thane; India) was used for designing. A custom tray was fabricated using DPI –RR cold cure material (Dental Products of India, The Bombay Burmah Trading Corporation limited). Border molding and functional impressions were made using a selective pressure technique. (Fig.3)
3. Record bases were made, and jaw relation was recorded (Fig 4). Maxillomandibular relation was recorded using the indentation technique, and the casts were articulated and mounted in centric relation.
4. The proper contour and vertical dimension were established using the maxillary occlusion rim. Maxillary teeth (Acryrock Ruthinium, Badiapolesine - ITALY) were arranged according to the contour of the maxillary occlusion rim and aligned with the occlusal surface, using a compensating curve to facilitate occlusal balance. During this process, the denture teeth were judiciously ground to achieve the best possible articulation coinciding with natural occlusion. (Fig.5)
5. The denture was fabricated using the conventional method of flasking and dewaxing (Pressure moulding technique). After the dewaxing procedure, denture titanium mesh (Dynamic Mesh, Stryker-Leibinger, and Freiburg, Germany) was placed (Fig.6). Packing of the denture was done with lucitone type heat cure acrylic resin (Luciton199, Dentsply), followed by curing, finishing, and polishing of the denture. (Fig.6)
6. After the final denture fabrication, the posterior artificial acrylic teeth were prepared with chamfer margins (i.e., with teeth 16, 17, 26, and 27) for the metal occlusal stops. (Fig.7) An impression of the prepared teeth on the denture was made using an irreversible hydrocolloid material and invested in dental stone. Wax patterns were then made on the model cast for the fabrication of metal crowns as occlusal stops. These patterns were invested, casted, finished, and polished.
7. The crowns were cemented onto the prepared teeth of the maxillary denture using glass ionomer luting cement (GC). (Fig. 8)
8. Denture insertion was done, and occlusal plane analysis was performed to check for premature occlusal contacts, which were rectified using articulating paper (Bausch 100  $\mu$ ). (Fig.9,10)
9. Post-insertion instructions were given to the patient, followed by a 3-month follow-up period. The patient expressed satisfaction with no post-operative complications.

### **Discussion:-**

In the Indian population, despite the availability of advanced implant-supported treatment options, heat-cure based single maxillary complete dentures remain the first choice for many restorative dentists when treating such patients<sup>6</sup>.

The use of denture titanium mesh in complete dentures has shown successful outcomes and offers several advantages compared to the more commonly used acrylic resin. To simplify the identification and treatment of patients, a proposed classification system has been introduced, comprising the following classes:

1. Class 1: Patients requiring minor or no tooth reduction to achieve balance.
2. Class 2: Patients necessitating minor additions to the height of the teeth to achieve balance.
3. Class 3: Patients requiring both tooth reduction and additions to achieve balance, often involving a change in the vertical dimension of occlusion.
4. Class 4: Patients presenting with occlusal discrepancies that require additions to the width of the occluding surface.
5. Class 5: Patients with combination syndrome, as described by Kelly<sup>7</sup>.

Referring to the above classification, the case report presented in this study falls under the Class I category, where minimal or no occlusal correction was needed due to the harmony of the mandibular plane.

The current case report details a technique for designing and fabricating a maxillary single complete denture using denture titanium mesh and metal occlusal stops opposing the lower natural teeth. The use of denture titanium mesh provides significant advantages, primarily focusing on preventing the wearing away of acrylic teeth.

The incorporation of metal occlusal stops further enhances the occlusal stability of the denture when opposing natural dentition, ensuring improved functional outcomes for the patient. The successful rehabilitation of the edentulous maxillary ridge in this case report demonstrates the effectiveness and benefits of using denture titanium mesh and metal occlusal stops in single complete denture treatments.

## Figures

**Fig.1:-** Maxillary and mandibular primary impressions.

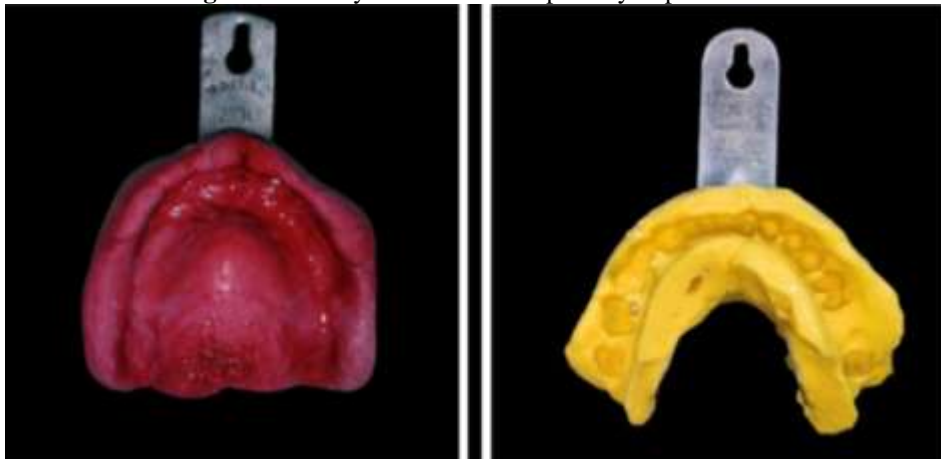
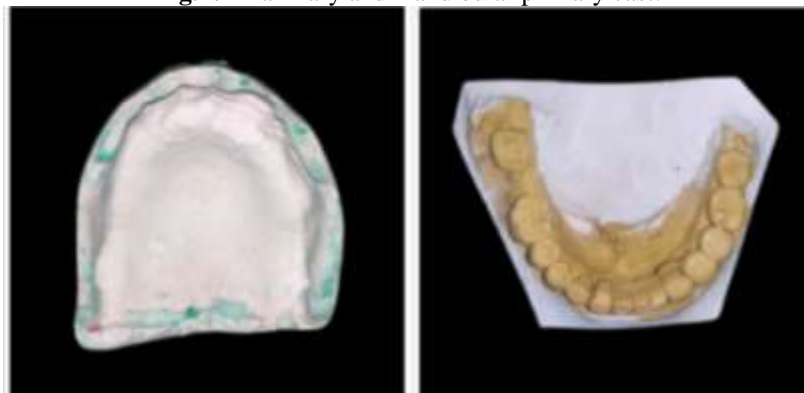
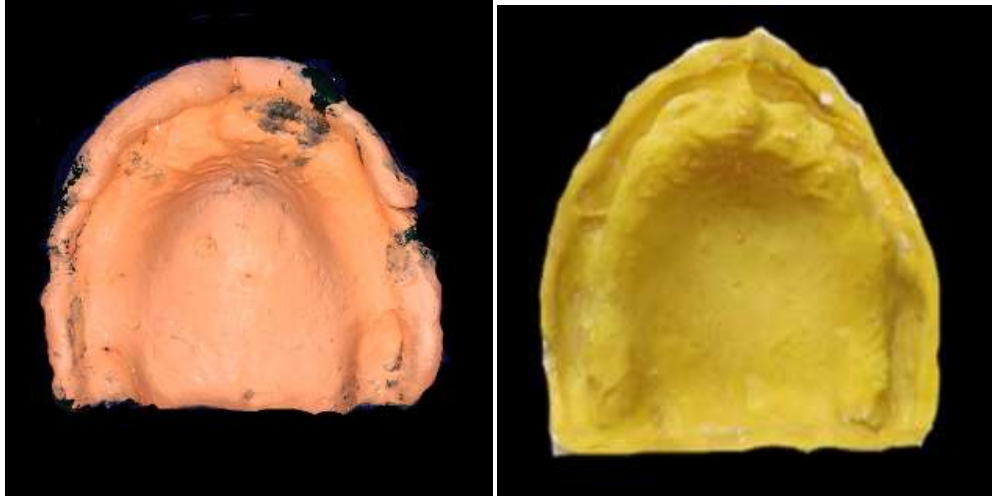


Fig.1 - Maxillary and mandibular primary impressions

**Fig.2:-** Maxillary and mandibular primary cast.

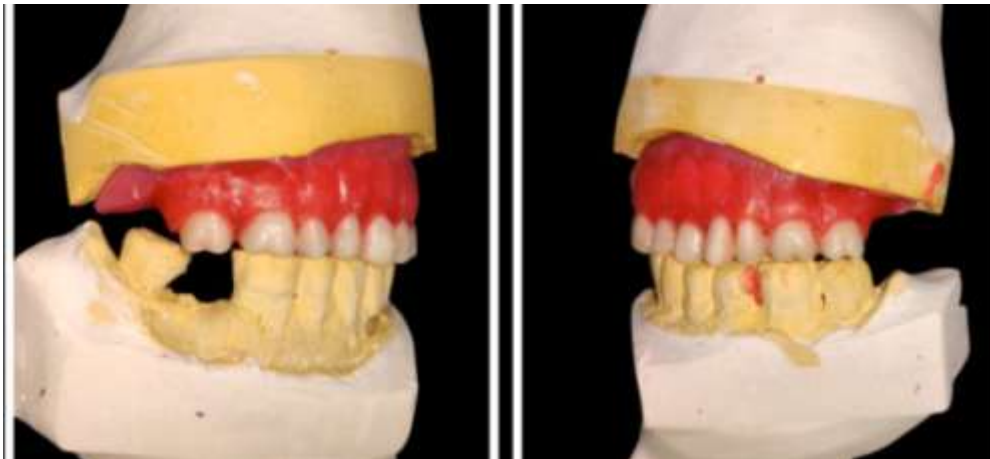




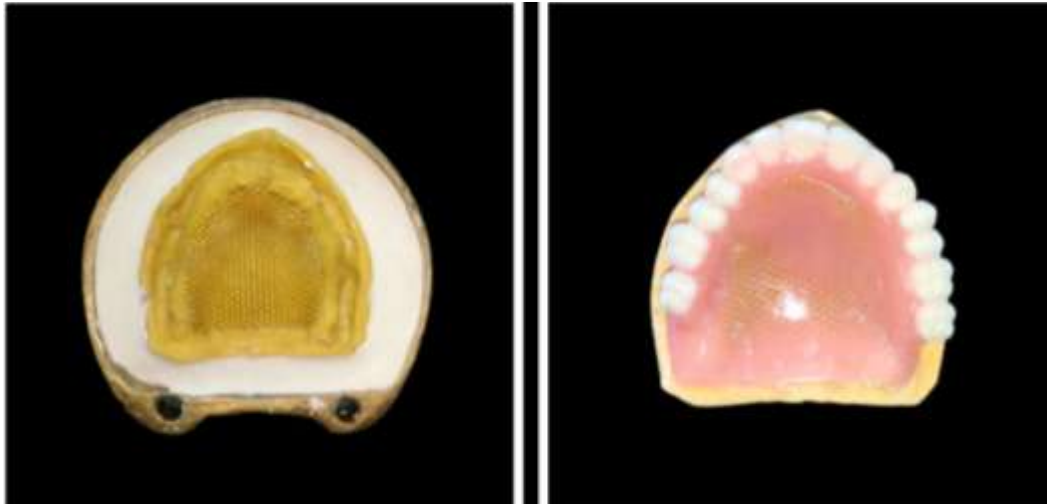
**Fig.3:-** Maxillary Border Molding With Zoe Paste And The Master Cast.



**Fig 4:-** Jaw Relation.



**Fig.5:-** Teeth Arrangement- Right And Lateral View.



**Fig.6:-** Mesh Placement After Dewaxing And Occlusal View Of The Final Processed Denture.



**Fig.7:-** Teeth Preparation With 16, 17 And 26, 27 For Metal Occlusal Stops.



**Fig. 8:-** Cameo View Of Final Denture With Metal Crowns As Occlusal Stops.





**Fig.9:-** Denture Insertion Frontal And Occlusal View.



**Fig.10:-** Pre Operative And Post Operative Photographs.

### Summary:

When dealing with patients who are edentulous in one arch while retaining some or all of their natural teeth in the opposing arch, providing a successful single complete denture treatment can be challenging. The key principles of retention, stability, and support should not be overlooked, and careful steps must be taken to ensure all components work in harmony for the success of the single maxillary complete denture. Proper attention to these factors is essential to achieve functional and aesthetic outcomes in such cases.

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