

## An Innovative Approach in Complete Denture Design for Oral Submucous Fibrosis Patient: Case Report.

### Abstract:

The field of prosthodontics is not merely a scientific discipline; it is also an art that involves adeptly managing patients facing challenges in undergoing conventional impression procedures. One prevalent limitation arises from difficulties in mouth opening, which can be attributed to various factors such as fractures, trauma, oral submucous fibrosis, temporomandibular joint ankylosis, among others. This case report outlines an inventive approach encompassing primary impression, a sectional custom tray, sectional denture base, and the implementation of a "customized hinge" for a hinge denture. This innovative technique demonstrates the interdisciplinary nature of prosthodontics, where creative solutions are tailored to address the unique circumstances of each patient, ensuring effective and personalized dental care.

**Key-words:** Hinge denture, molar tube, oral submucous fibrosis, restricted mouth opening, sectional denture

### Introduction:

Oral submucous fibrosis (OSMF) is delineated as a persistent affliction of the oral mucosa marked by inflammation and progressive fibrosis of the lamina propria and deeper connective tissue strata. Several factors incite the disease process by eliciting a juxta epithelial inflammatory reaction in the oral mucosa. Postulated contributory elements comprise areca nut consumption, ingestion of piquant substances, nutritional deficiencies, genetic and immunologic processes, and sundry other factors. The presenting symptoms of OSMF encompass a sensation of burning pain, a gradual loss of ability to articulate the mouth, and challenges in mastication and deglutition. (1) A constrained oral aperture, appearing smaller than the dimensions of a full denture, poses a considerable challenge for prosthetic interventions. When the utilization of conventional impression trays or the denture itself becomes impracticable for insertion and removal in the oral cavity, various methodologies have been outlined to address such limitations. Optimal tray placement during impression procedures mandates a generous mouth opening. In instances of restricted opening capacity, a modification of the standard impression technique becomes imperative to

effectively execute this foundational phase in the creation of a prosthetic appliance. (2) Various prosthodontic treatment modalities for individuals with microstomia have been elucidated in the literature, [3,4] alongside the depiction of numerous devices designed to widen the oral commissure. [2-5] In their work, Watanabe et al., [6] as well as Sonune and Dange, [7] delineated the construction of a conventional complete denture employing a minimal pressure technique. This case report highlights pioneering techniques in prosthodontics, covering inventive methods in primary impressions, the crafting of a sectional custom tray, fabrication of a sectional denture base, and the implementation of a "customized hinge" for a hinged complete denture.

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**Case Report:**

A 56-year-old patient presented in Department Of Prosthodontics, Crown And Bridge & Implantology, Maharana Pratap College Of Dentistry And Research Centre Gwalior (M.P) with the chief complaint of missing teeth in both dental arches, expressing a desire for their restoration. The patient disclosed a 20-year history of chewing tobacco and was identified as a case of Oral Submucous Fibrosis (OSMF) without ongoing medication. The diagnosis was established through clinical observation.

Upon examination, the mouth opening was notably limited, measuring approximately 18-19 mm (interidge distance) (Fig 1). Palpation revealed fibrotic bands on the buccal mucosa, and also present on the floor of the mouth. The patient declined surgical intervention for widening the mouth aperture. Consequently, a denture prosthesis was planned, incorporating an altered impression procedure to accommodate the restricted mouth opening.

**Procedure:**

- 1) The insertion of a standard impression tray for the preliminary impression proved unfeasible. Primary impression for maxillary and mandibular arches was achieved using a modified plastic stock tray along with elastomeric impression material (Fig 2a, 2b, 2c).
- 2) A primary cast was subsequently created by pouring type II dental plaster (Dentico; Neelkanth Mine Chem.)
- 3) Special trays for both the maxillary and mandibular arches were crafted, incorporating innovative elements such as dowel pins with plastic sleeves, and magnets to ensure accurate approximation during the impression process.(Fig 3a,3b)
- 4) Sectional border molding was carried out using a low-fusing compound (DPI Pinnacle, India), followed by the final impression made with light body addition silicone (Aquasil, Dentsply, India) (Fig 4).
- 5) The fabrication of denture bases involved the use of orthodontic wires, resulting in sectional bases that could be easily re-joined. The inclusion of pins and holes on each side facilitated the subsequent re-joining process. .
- 6) Occlusal rims were constructed using modeling wax (MAARC modeling wax). The re-joining of the sectional denture bases in the oral cavity were facilitated with pin and hole adjustments, Subsequently, jaw relation records were obtained and TRY-IN was done(Fig 5)
- 7) Dentures were finished and polished. Subsequently, a precise sectioning from the midline was executed, employing a thin disk bur—a specialized dental instrument designed for intricate cutting and shaping tasks.
- 8) Innovative hinge assemblies for maxillary and mandibular sectional dentures, featuring orthodontic mandibular molar tubes and 1-mm stainless steel wires, address restricted mouth opening. Crafted with precision, they enable collapsibility at the midline. Integration with

self-cure acrylic resin ensures stability, functionality, showcasing advanced prosthodontic solutions. (Fig6,7)

- 9) The final step involved successfully positioning the hinged dentures in the patient's oral cavity, ensuring optimal fit and functionality. (Fig 8)

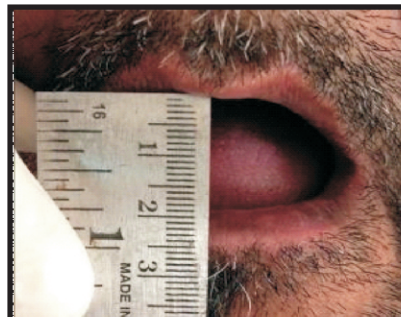


Fig 1-extra Oral Examination

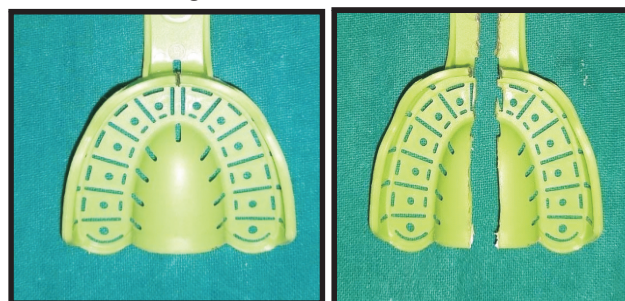


Fig 2(a)-modification of Plastic Stock Tray for Maxillary Primary Impression

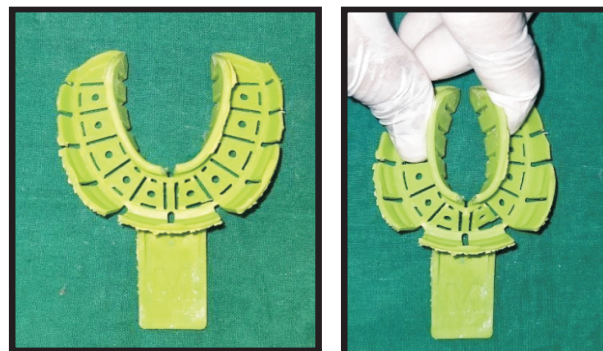


Fig 2 (b)-modification of Plastic Stock Tray for Mandibular Primary Impression

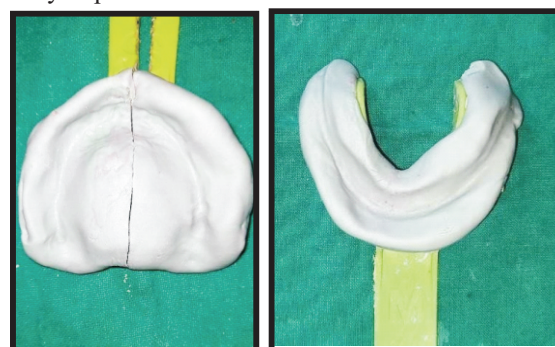


Fig. 2 (C) - Primary Impression



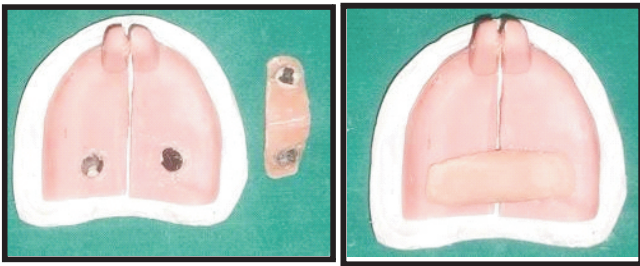


Fig 3 (a) -for Fabricating Maxillary Sectional Custom Tray, “dowel Pin” With Special Plastic Sleeve Was Incorporated In The Handle And Magnets Were Used For The Proper Approximation OfThe Auto Polymerized Resin Tray

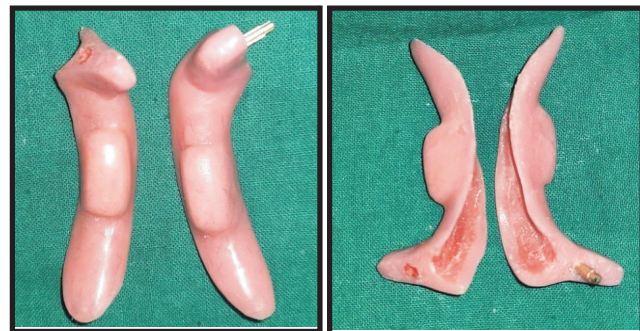


Fig 3 (b)-for Fabricating Mandibular Sectional Custom Tray, “dowel Pin” With Special Plastic Sleeve Was Incorporated In The Handle OfThe Auto Polymerized Resin Tray



FIG 4 -Sectional border molding was performed with low fusing compound (DPI Pinnacle tracing sticks, India) and final impression was made with light body condensation silicone material

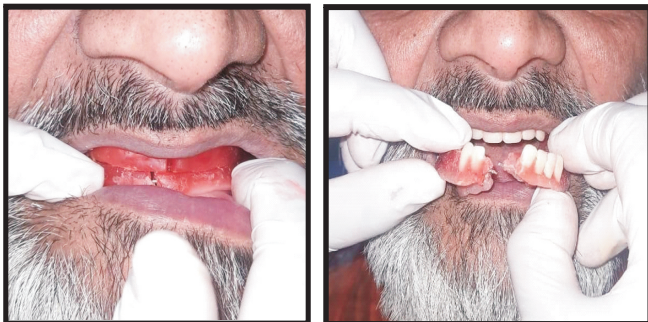


Fig 5 Jaw Realtion And -try In

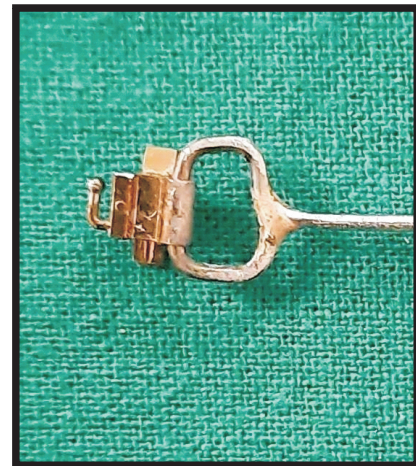


Fig 6- Hinge

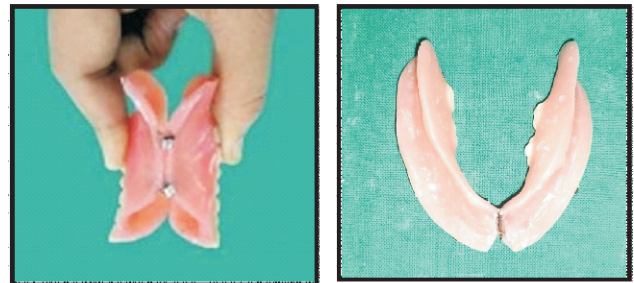


Fig 7-maxillary And Mandibular Hinged



Denture. Fig 8-pre-operative &Post Operative

**Discussion:**

This literature review delves into innovative methodologies for the creation of sectional and hinged trays in the context of complete dentures. Departing from conventional techniques involving sectional stock trays or putty, the case study introduces a unique modification—a flexible unified putty impression derived from adapting a plastic stock tray. This novel approach enhances tray support during impressions. For cost-effectiveness and practicality, the utilization of a dowel pin with a plastic sleeve, typically found in the pindex system, is advocated. This not only acts as an anti-rotation feature but also renders the custom tray sectional, facilitating easy reattachment. In addressing the challenge of potential interference, a 20-gauge orthodontic wire, matching the denture base thickness, is deemed superior. This choice prevents complications and ensures a smoother prosthodontic process. The authors underscore the superiority of a

customized hinge for sectional dentures compared to more intricate devices. Despite spatial constraints, the customized hinge not only yields optimal results but also contributes to a reduction in overall prosthesis costs. This discussion emphasizes the paramount importance of practical and cost-efficient innovations in prosthodontics, showcasing the potential to enhance both the quality of care and economic considerations in dental practice.

### **Conclusion:**

In overcoming challenges posed by limited mouth opening, strategic planning and tailored sectional prosthesis design prove essential. Addressing impression difficulties ensures functional and stable prostheses, enhancing the patient's daily experience. A systematic and patient-centered approach in prosthodontics improves overall care quality, emphasizing both technical excellence and the patient's well-being.

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