

## Rehabilitation of Partial Mandibulectomy Case with Modified Swing-Lock Design

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**Abstract:** Partial mandibulectomy can result the mandibular defect which needs surgical and prosthetic intervention. This case report describes the functional and esthetic rehabilitation of the defect with the wrap around swing-lock prosthesis using acetyl resin after the surgical rehabilitation with fibula free flap.

**Key words:** Partial mandibulectomy • Wrap around swing-lock • Partial Denture • Acetyl resin

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### INTRODUCTION

The prosthetic rehabilitation in the mandibular defect can lack the retention, support and stability due to missing part of mandible and teeth. During the prosthetic rehabilitation, the remaining structures should be properly used to distribute the occlusal forces to all teeth and stress bearing areas. Swing-lock prosthesis which was introduced in 1963 utilizes all the remaining teeth instead of few abutments for retention and stabilization [1]. Conventionally, it is used for the periodontally compromised abutment teeth to stabilize after periodontal therapy [2]. Javis *et al.* suggested that swing-lock is compatible where the conventional designs those are not suitable and that could not be used for added retention in the defect area [3].

To retain the prosthesis, a retentive part is applied to an abutment tooth which can be fabricated of metal (chromium cobalt), acetyl resin and acrylic resin. In the esthetic region, acetyl resin can be an alternative to chromium cobalt (Cr-Co), which is the thermoplastic technopolymer formed by polymerizing formaldehyde. It provides not only superior esthetic but also superior flexibility making preferable to use in the undercut areas [4,5]. Acrylic resins are used normally as an acrylic veneer by locking into labial undercuts of abutment teeth [6].

Wrap around designed retainer are used after the orthodontic treatment to passively hold the teeth in position. The advantage of swing-lock design is to increase the retention and stability by making contact with the more tooth surface area and the undercut.

However, the main drawback is the compromised esthetic. This paper describes the wrap around swing-lock design using the white acetyl resin which not only increased the retention and stability without compromising the esthetics.

**Case Report:** A 36-year-old male visited for the prosthetic rehabilitation of the left mandibular defect. The patient had a past history of Mucoepidermoid carcinoma of left sublingual gland. He underwent for partial mandibulectomy with removal of the left sublingual LN, which was followed by the fibula free flap and radiation of 7000cGy for 35 fractions. Prosthetic rehabilitation was preceded after healing was completed. The clinical and radiographic examinations (Fig. 1-2) were done to evaluate the condition of the remaining teeth of mandibular arch. Since the main concern was to distribute the occlusal force among the remaining teeth, swing-lock design was chosen as it preserves and maintains the existing hard and soft tissue.

The preliminary impression of lower arch was taken with irreversible hydrocolloid (Jeltrate; Dentsply, USA) and poured with type III dental stone (Lafarage; Prestia, Meiel, France). The cast was surveyed and designed to determine the position of occlusal rest, guiding plane and necessary alteration of the teeth. After the necessary mouth preparation, the final impression was taken with irreversible hydrocolloid using stock tray and poured with Type IV stone (Vel-mix; Kerr Products, USA) immediately. The lower cast was surveyed again and the framework was designed and casted with cobalt-chromium

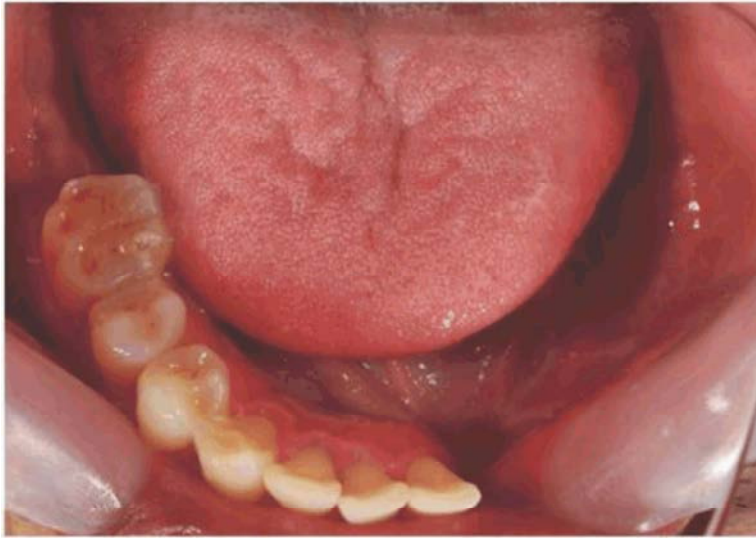


Fig. 1: Postoperative intra-oral view of the surgical defect.



Fig. 2: Orthopantomograph showing the free fibula flap with plating.

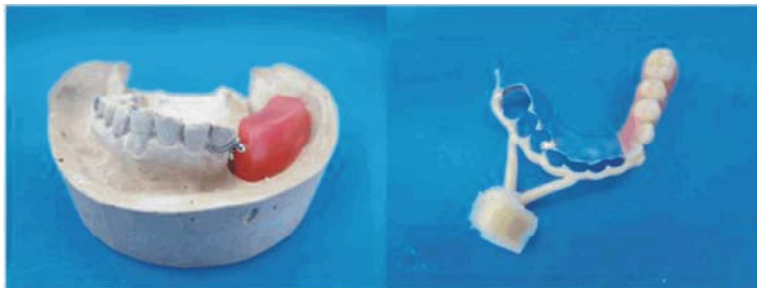


Fig. 3: A. "C" clasp wrought wire added to retain the framework. B. Acetyl resin swing-lock.



Fig. 4: The final processed swing-lock partial denture showing the lock.



Fig. 5: The Swing-lock partial denture delivery in occlusal and left lateral view.

(Vitallium; Dentsply, USA). The metal framework was tried to verify the proper seating and adjusted. A photopolymerized polymethyl methacrylate resin (Lightplast Base Plates; DreveDentamid GmbH, Germany) was cured on the retentive meshwork and proceeded with functional movement using low fusing modeling plastic impression compound (Kerr Green Stick; Kerr Corp, USA) and functional impression was taken with tissue conditioner material (COE-COMFORT tissue conditioner; GC America Inc, USA). Altered cast technique was performed in the lab following conventional method. The maxillo-mandibular relationship was recorded using bite block and bite registration material (Occlufast; Zhermack SpA, Italy). The acrylic artificial teeth were set to obtain unilateral balanced occlusion. After teeth trial, the denture was flaked, finished and polished. To retain the metal framework, wrought wire "C" clasp was welded on the framework near the terminal abutment adjacent to defect area (Fig. 3A) which was removed after flaking of the denture to add the acetyl resin swing-lock through injection molding technique (Fig. 3B).

The final denture consisted of lock between the acetyl clasp and the metal portion of the removable partial denture (Fig. 4). During the denture delivery, retention and stability were evaluated and was adequate (Fig. 5). Furthermore, pressure points were located using pressure indicating paste and relieved to prevent the compression on soft tissue over extension of the border. Oral hygiene instructions given and fluoride paste (GC Tooth Mousse; GC Dental Products Corp, Japan) were prescribed. Patient was recalled after 24 hour, 1 week, 2 week, 1 month and 6 month for follow-up.

## DISCUSSION

Gerngross *et al* reported to have 1.7 times greater chances of the post insertion complications in irradiated cases. Moreover, the patients who experienced more than 5000 cGy had comparatively more complications of

exposed bone, sequestrum removal, ulcer and denture sores after the insertion of the prosthesis [7]. In the present case, the patient underwent for total dose of 7000 cGy, therefore the simple swing-lock design was chosen to avoid the unnecessary stress on the remaining structures. Considering the esthetic concern of the patient and occlusal force distribution, the author designed to combine the wrap around from orthodontic retainer and the latch and lock of swing-lock design. Therefore, the wrap around swing-lock design with acetyl clasp was planned.

Normally, swing-lock design is indicated in; 1) case of missing or periodontally weak abutment 2) cases of large distal extension bases or maxillofacial defects where the remaining dental and alveolar undercuts would not provide the adequate retention for conventional removable denture. In case of poor manual dexterity, shallow vestibule, high frenal attachment and limited mouth opening swing-lock prosthesis is contraindicated [8]. For the wrap around swing-lock design, the labial sulcus depth and high frenal attachment are not a concern as it uses the interproximal undercuts on the labial and buccal aspect of the remaining teeth.

Wu *et al.* [9] showed no significant difference in deformation between acetyl resin and metal alloy direct retainers in facial view. The modulus of elasticity of acetyl resin is 2.9 to 3.5 kN/mm<sup>2</sup> and Cr-Co alloys is 22.43 kN/mm<sup>2</sup>, acetyl resin has superior flexibility which allow its use in larger retentive undercuts such as in the interproximal area. Although acetyl resin clasps are resilient to engage the undercuts, for the retention of the prosthesis, greater thickness is required compared to the metal clasp due to lower flexural modulus. The thicker design can cause the accumulation of the plaque and affect the gingival and periodontal health. Therefore, the patient should be encouraged for the hygiene maintenance [5]. The position of the lock and hinge should let the patient lock and remove easily and does not interfere with the occlusion.

### CONCLUSION

In the maxillofacial defect where some soft and hard tissues are missing, the retention, stability and support may be improved by making use of the remaining structures. Swing-lock with wraparound acetyl clasp can optimize the retention and stabilize along with splinting of the remaining teeth without compromising the esthetic and function.

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