

Case Report

Implant Retained Overdenture Improves the Retention and Stability by Using a Locator[®] System in a Mandibular Edentulous patient: A Case Report

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Abstract

Complete maxillary and mandibular dentures have been used as a conventional treatment of edentulous patients for longer than a century. Suitable complete maxillary dentures are usually well tolerated but many patients struggle to chew and swallow with the complete mandibular denture because it is too unstable. Previous studies have shown that a mandibular two-implant retained overdenture is superior to the conventional denture in terms of retention and stability. Thereby, the two-implant assisted mandibular overdenture should be the first treatment option for mandibular edentulous patients. In this report, a mandibular two-implant retained overdenture with Locator[®] attachments by using direct intraoral pick-up technique was discussed.

Keywords: Implant-retained, Overdenture, Retention, Stability, Locator System

Introduction

Complete maxillary and mandibular dentures have been served as a conventional treatment of edentulous patients for longer than a century. Suitable complete maxillary dentures are usually well tolerated but many wearers struggle to eat with the complete mandibular denture because it is relatively unstable. Previous studies have shown that a mandibular two-implant retained overdenture is superior to the conventional denture¹. Thereby, the two-implant assisted mandibular overdenture is the first treatment option for mandibular edentulous patients².

A successful mandibular complete denture relies on sufficient retention and stability. Redford et al demonstrated that more than 50% of conventional mandibular complete dentures have problems with retention and stability³. Mandibular two-implant overdentures have been shown to be superior to conventional dentures in randomized and non-randomized clinical trials with the observation time from six months to nine years⁴. According to consensus statements of Feine et al⁵, the two-implant retained overdenture should be the first treatment choice for mandibular edentulous patients.

When dentists make the treatment plan and selection of the attaching mechanism for an implant-retained overdenture, they should consider the following factors: [1] cost effectiveness, [2] amount of retention needed, [3] pain caused



Fig. 1-a The patient's lower jaw was shifted to the right side when she wore the old dentures.

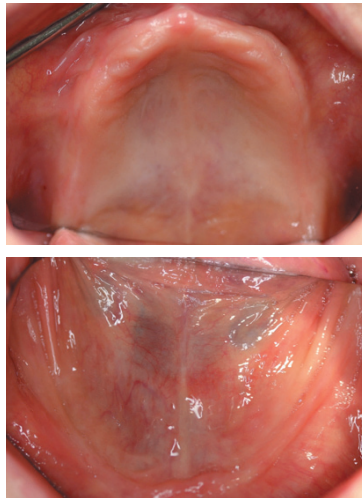


Fig. 1-b Severe ridge resorption, especially in the lower jaw.



Fig. 1-c Plaque deposition and unilateral crossbite were shown on patient's old dentures.

on the soft tissue, [4] amount of available bone, [5] expected level of oral hygiene, [6] patient's social economic status, [7] patient's expectation, [8] maxillomandibular relationship, [9] status of the antagonistic jaw, and [10] inter-implant distance.

In this report, we applied a mandibular implant-retained overdenture with Locator® attachments by using intraoral pick-up technique.

Case report

A 70 year-old female patient visited Taipei Medical University Hospital prosthodontic department with chief complaint of poor retention of old dentures, and wanted to renew her maxillary and mandibular complete dentures.

The patient was generally healthy, independent, and with medically controlled hepatitis. The existing prostheses, which were fabricated 2 years ago, include maxillary and mandibular complete dentures. The patient was not satisfied with the existing prostheses. Her major complaint with the prostheses was the rocking of dentures during speaking and chewing. She had to take off her dentures in order to swallow the food.

Extraoral examination revealed that the lower third of the patient's face was shifted to the right side when she wore the old dentures (Fig. 1-a). The jaw relationship was prognathic according to Angle's classification. Otherwise, the extraoral physical examination was within normal limit. Intraoral examination revealed that alveolar ridges of maxilla and mandible were severely resorbed, especially in

the mandible (Fig. 1-b). Border and frenum attachments were relatively low and located too close to the crest of the residual ridges. Maxillary edentulous ridge was noticed as a round to taper shape but mandibular ridge appeared to be a short inverted "V" and "W" shape covered by firm soft tissue. An excessive interarch space was noticed due to severe ridge resorption. The complete maxillary and mandibular dentures showed poor retention, stability, and border extension. Moreover, unilateral crossbite of right side teeth and poor oral hygiene with plaque accumulation were noticed. (Fig. 1-c)

Chair-side tissue conditioner (Lynal®, Dentsply Caulk, U.S.A.) and Unifast® self-cured resin occlusal relines were performed to improve the tissue adaptation and the occlusion of the old dentures. After panoramic X-ray and dental CT scan evaluation with oral surgeon's consultation, the treatment plan with maxillary conventional complete denture and mandibular two-implant retained overdenture was suggested and accepted by the patient.

Thus, the relined mandibular denture was duplicated to make a surgical stent for one stage Astra® (Astra Tech AB, Sweden) implant placement over the right and left canine sites. During healing period, multiple chair side relines with tissue conditioner were performed. After 3 months of healing time for osseointegration, the healing abutments of mandibular implants were replaced with Locator® (Zest Anchors, U.S.A.) abutments. (Fig. 2-a~c)

Alginate preliminary impression for both arches were obtained and followed by fabrication of individual trays (Ostron®, GC

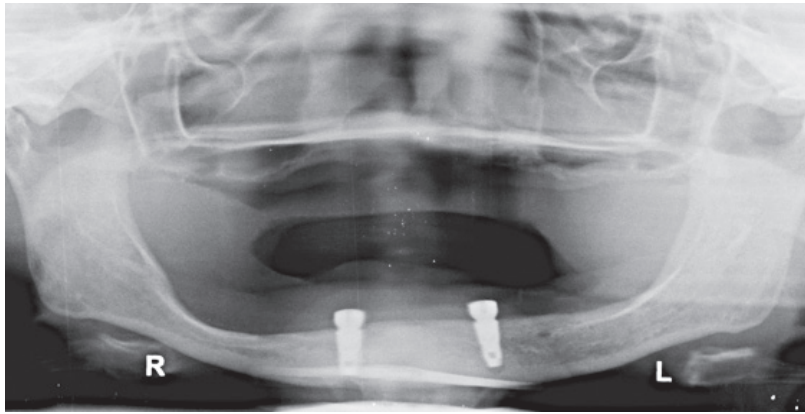


Fig. 2-a Panoramic radiograph was taken three months after implant placement.

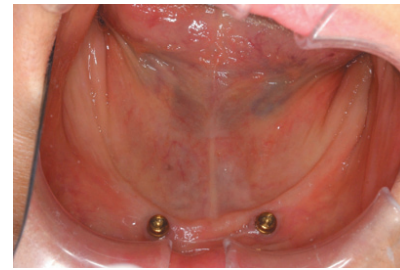


Fig. 2-b Intraoral view of Locator® abutments connected to the implants.

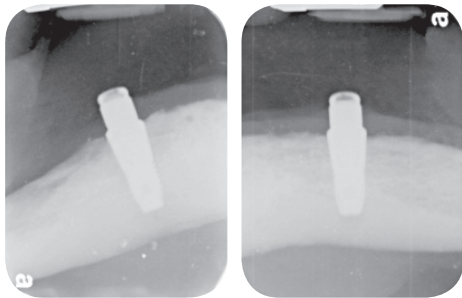


Fig. 2-c Periapical X-ray film of implants with Locator® abutments.

Corporation, Japan), which refined borders with molding compound (Peri Compound®, GC Corporation, Japan). Final impressions were made with vinyl polysiloxane impression materials (Virtual®, Ivoclar Vivadent, Italy), with Locator® impression copings (Zest Anchors, U.S.A.) for mandibular arch (Fig. 3-a~d). The master casts were poured to fabricate record bases and occlusal rims with metal housing in the mandibular record base. Vertical dimension, occlusal plane and lip support were evaluated and duplicated with record bases and occlusal rims. Face bow transfer with the interocclusal record were obtained by using vinyl polysiloxane bite registration material (StoneBite®, Dreve Dentamid GmbH, Germa-

ny). The master casts were then mounted on a semi-adjustable articulator.

Vertical dimension, lip support, and phonetics were re-evaluated with wax dentures after denture teeth (Ivoclar Vivadent AG, Liechtenstein) were arranged. Concomitantly, eccentric records were obtained to refine denture teeth setting. The refractory casts were duplicated to fabricate maxillary and mandibular denture metal frameworks. Before packing (Lucitone 199®, Densply, U.S.A.), Locator® metal housing was removed from mandibular wax denture. Selective grinding was performed to gain a fully balanced occlusion after denture processing and laboratory remounting. Dentures were then delivered and tissue adaptation was first assessed in the oral cavity. After adjustment of tissue and polishing surfaces, interocclusal record was obtained using Aluwax® (Aluwax Dental Products Co., U.S.A.) for clinical remounting and occlusal adjustment. Finally, maxillary and mandibular dentures were delivered to patient without metal housing and plastic male part (Fig. 4).

The metal housings with processing male parts were picked up with auto polymerizing resin (Unifast Trad®, GC Corporation, Japan) after two appointments of denture adjustment to get rid of sore spots and occlusal interferenc-

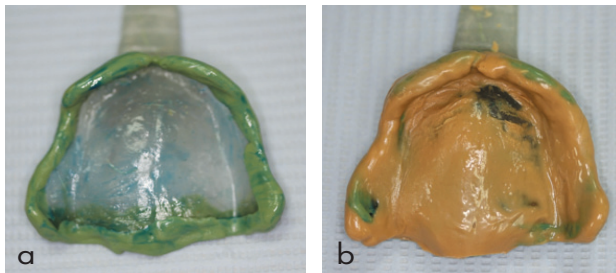


Fig. 3-a & b Refined individual tray and final impression of maxillary arch

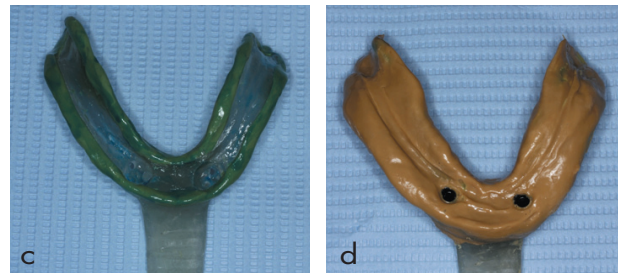


Fig. 3-c & d Refined individual tray and final impression of mandibular arch



Fig. 4 Funaliyed maxillary and mandibular complete dentures

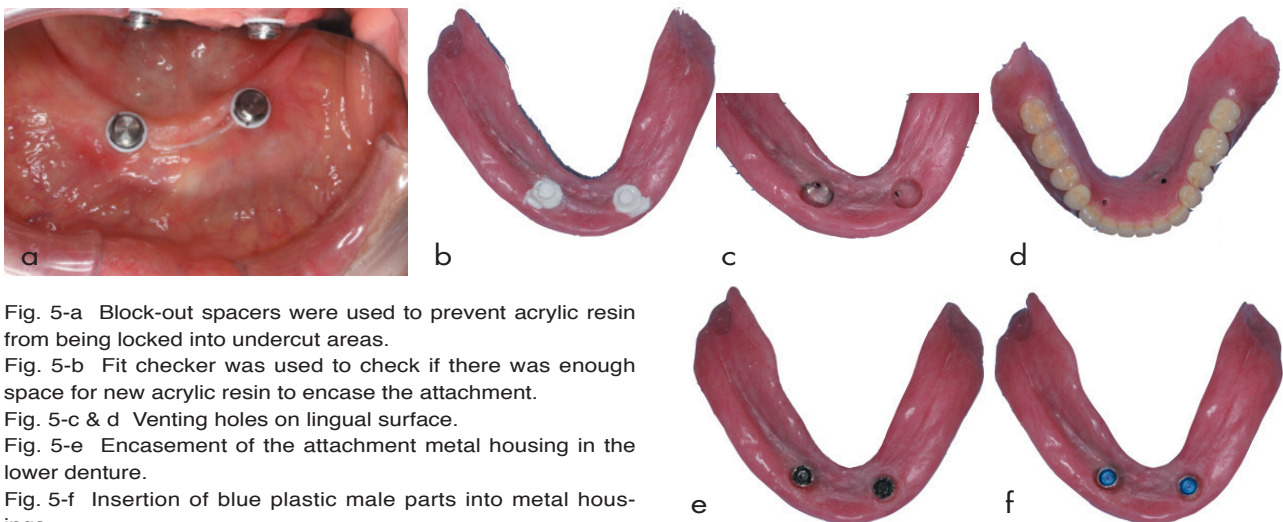


Fig. 5-a Block-out spacers were used to prevent acrylic resin from being locked into undercut areas.

Fig. 5-b Fit checker was used to check if there was enough space for new acrylic resin to encase the attachment.

Fig. 5-c & d Venting holes on lingual surface.

Fig. 5-e Encasement of the attachment metal housing in the lower denture.

Fig. 5-f Insertion of blue plastic male parts into metal housings.

es. The relief area was provided inside the mandibular denture to create space for new acrylic resin to encase the attachment. The relief holes were drilled on the relief space to ensure passive seating over abutments and attachments. Simultaneously, the white block-out spacers were used to prevent acrylic resin from being locked into undercut areas (Fig. 5-a~c).

Manual stabilization of the mandibular denture preceded patient's closure into centric occlusion during polymerization of acrylic resin. After resin polymerization, the denture was removed from oral cavity and was confirmed that stability and adequate encasement of the attachment housing in the acrylic resin. The definitive attachments were then inserted into the metal housing with adequate engagement

of the Locator® abutments intraorally (Fig. 5-d~f). The patient was instructed with the insertion and maintenance of the dentures after occlusal adjustment and the verification of soft tissue adaptation. The patient was well trained to use the new dentures, and was satisfied with the good stability and better retention of the mandibular denture.

Discussion

In this case report, patient noticed that her facial midline off when wearing the old dentures. She also complained about difficulty in chewing and swallowing food as she wore the old dentures. After the implant-assisted mandibular overdenture and new maxillary complete denture treatment, we found her facial



Fig. 6 Extraoral view of the patient with new dentures.

midline shift was corrected to normal range, indicating that the old dentures occluded in an inappropriate horizontal position instead of CR position (Fig. 6). These drawbacks resulted in the shift of the mandible to the right side and chewing difficulty as well as swallow problems during eating.

We used the direct procedure to connect a mandibular implant-retained overdenture with Locator® attachments. This procedure could significantly reduce the rate of error from clinical impression and laboratory processing. Nissan et al⁶ stated that the direct technique for attachment incorporation in mandibular implant-supported overdentures by using ball attachments is superior to the indirect technique in terms of aftercare over a long-term evaluation period. Nevertheless, we still found pressure spots after delivering the mandibular implant-assisted overdenture. To remove the pressured spots, the adaptation of soft tissue surface of the mandibular denture should be re-assessed with pressure indicating paste after connecting the attachment introrally.

Previous series studies conducted by McGill University revealed that the implant-retained mandibular overdenture group is superior to conventional denture not only in overall satisfaction⁷, chewing satisfaction^{8,9}, nutritional status¹⁰, eating and social activity¹¹, but also easier to fabrication¹². Moreover, the implant retained mandibular overdenture is a cost-effective intervention¹³. In consistent with McGill group, we have the similar improvements in patient outcomes and easier task in the fabrication procedures.

Conclusion

The patient benefited tremendously from the mandibular implant-retained overdenture as presented in this clinical report. The fabrication procedure is relatively easier as compared with that for conventional denture. Therefore, the two implant-retained overdenture should be considered as the first treatment option for mandibular edentulous patients.

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