

## A Case of Single Implant Overdenture with Magnetic Attachment

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### I. Introduction

Single-implant overdentures (S-IODs) for edentulous mandibular patients can reduce treatment costs and surgical invasiveness, and relatively high success rates have been reported. In this report, we present a case of single implant retained overdenture with magnetic attachment.

### II. Objective

Although the height and width of residual ridge was sufficient for two implant overdenture (2-IOD), we chose a S-IOD with one implant placed in the midline of mandible because of economic reasons and less surgical invasion.

### III. Case report

#### 1 Patient Information

The patient was a 66-year-old female, presented to our hospital with a chief complaint of broken dentures and difficulty in chewing. Her remaining teeth were suffering from severe periodontal disease, and anterior crown was removed from maxillary right canine. Her existing denture had been used approximately 5 years ago with lots of repairs to denture failure. There were no special notes on her general history.

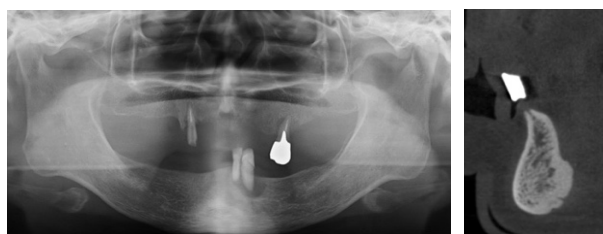


Figure 1. Panoramic radiograph at the first examination and computerized tomography



Figure 2. Intraoral views at the first examination

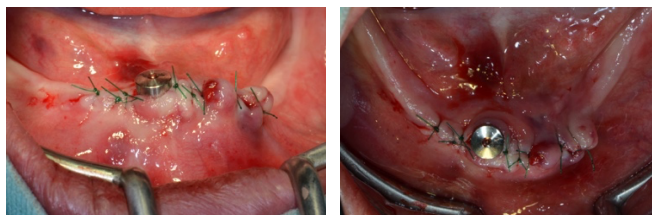


Figure 3. Existing maxillary and mandibular removable partial dentures

## 2 Treatment Procedures

Since alveolar bone resorption and movement of the maxillary right canine tooth were observed, a maxillary overdenture was selected to improve the crown-root ratio. For mandible, S-IOD was selected to retain and stabilize the denture after the extraction of the remaining teeth with severe periodontal disease.

- 1) After extraction of the mandibular left lateral incisor and canine, one implant (Standard Plus, 3.3 mm × 12 mm, Straumann, Basel, Switzerland) was simultaneously placed using surgical guide (Fig.4 and 5).



**Figure 4. Placement of one implant**



**Figure 5. Panoramic radiograph after implant placement**

- 2) Three weeks after implant placement, the healing abutment was fitted to denture base with autopolymerized resin for early loading (Fig.6). One month after implant placement, a magnetic attachment (MagFit, Aichi Steel, Aichi, Japan ; a flat-top type with 750 gf magnetic attractive force) was replaced from the healing abutment for denture retention (Fig.7).



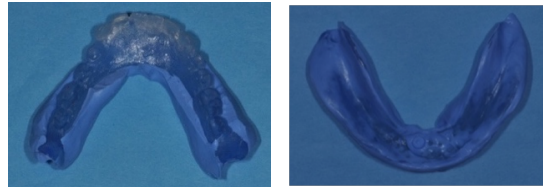
**Figure 6. Early loading was added 3 weeks after implant placement**



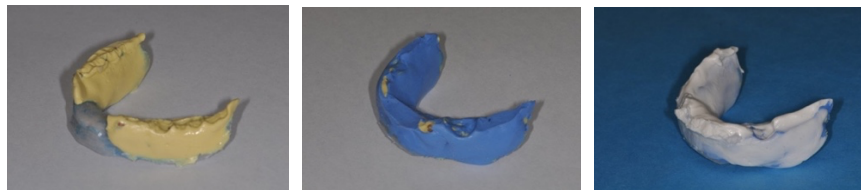
**Figure 7. Placemnet of magnetic attachment**

- 3) After magnetic attachment was placed , the definitive impression was made and occlusal

relationship was recorded for the mandibular S-IOD using a duplicate denture (Fig.8), a working cast was fabricated. To record the denture space, Piezography technique was performed to record the muscle pressure surface using silicone impression material (Exafine , GC, Tokyo, Japan) by the patient pronounces "SIS, SE, SO, TE, DE, MOO, SEES" etc, (Fig.9).

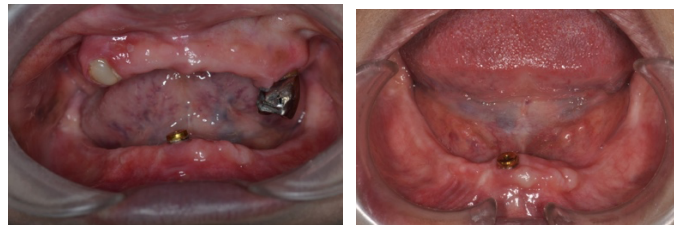


**Figure 8. Definitive impressions using duplicate dentures**



**Figure 9. Piezography**

- 4) Denture teeth were arranged and the wax denture was made within the muscle pressure surface morphology obtained by piezography technique.
- 5) RPD with a wire clasp on the left second premolar and resin copings on the right canine was deliver for maxillary jaw. For mandiblar jaw, S-IOD with magnetic attachment was also delivered (Fig.10 and 11). The S-IOD was reinforced by a metal structural framework to improve the strength and rigidity of the denture (Fig.12).



**Figure 10. Intraoral view without denture**



**Figure 11. Placement of final removable denture**



### Figure 12. Completed mandibular S-IOD

- 6) The definitive denture was fitted without pain. Bilateral balanced occlusion was added to prevent the denture mobility and lateral force to the implant (Fig.13).



Figure 13. Occlusal contacts relationship during lateral movements

## IV. Results

The coefficient of variance of masticatory movements was measured using a Biopack (Biopack, Yoshida, Tokyo, Japan). The definitive denture with magnetite attachment showed the stable masticatory movements in all masticatory phases and cycles compared to the existing denture without magnetic attachments (Fig.14).

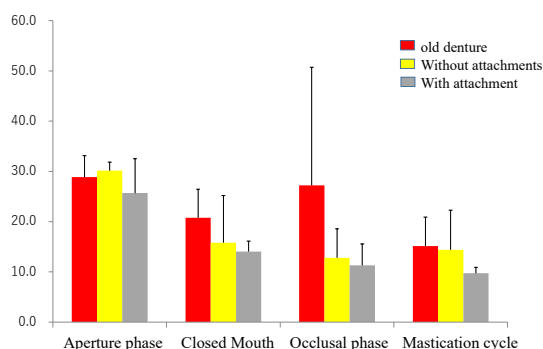


Figure 14. Coefficient of variance of masticatory movements

Pre- and postoperative occlusal examination were performed using Dental Prescale I (Dental Prescale I, GC, Tokyo, Japan). The postoperative occlusal contact area was approximately twice values compared to the preoperative area, and the occlusal force was approximately four times larger than the preoperative one (Fig.15).

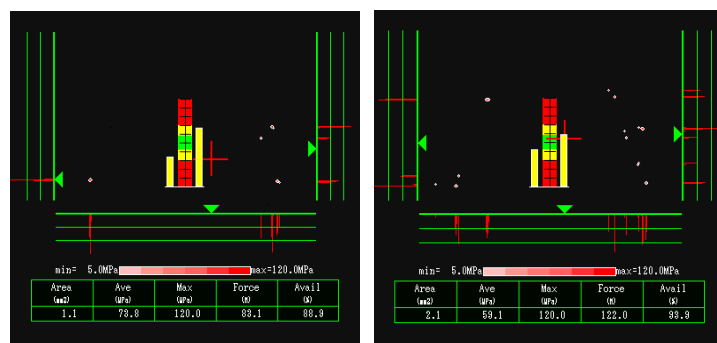


Figure 15. Occlusal examination (Left: Preoperative, Right: Postoperative)

## V. Discussions

The S-IOD has a single fulcrum point compared to the 2-IOD, which allows more freedom of the denture movements. The careful maintenance must be necessary compared to the conventional 2-IODs to prevent the implant lost.

## VI. Conclusions

It has been 9 years since the S-IOD was placed, and there has been no significant bone resorption around the implant, no change of retentive force, and no denture failures, resulting in improved masticatory efficiency and highly patient satisfaction. The application of magnetic attachments to the S-IODs reduced the lateral pressure to the implants and resulted in a good outcome.

## References

- 1) Walton JN, Glick N, Macentee MI. A randomized clinical trial comparing patient satisfaction and prosthetic outcomes with mandibular overdentures retained by one or two implants. *Int J Prosthodont.* 2009;22(4):331-9.