

A clinical case of implant overdenture with magnetic attachment using CAD/CAM technology

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Abstract

【Objective】

In recent years, digital dentistry based on computer-aided design and computer-aided manufacturing (CAD/CAM) has become increasingly popular, and the workflow for the fabrication of removable dentures has changed dramatically. This case was used CAD/CAM technology for maxillary conventional overdenture and mandibular implant overdenture (IOD) with magnetic attachments.

【Method】

CAD/CAM dentures were fabricated using DENTCA system (DENTCA Inc., Mitsui Chemical Inc.). On the initial visit, exclusive plastic trays (DENTCA tray, DENTCA Inc.) were used for making definitive impression, determination of vertical dimension, and recording of the centric relation with gothic-arch tracing. On the second visit, 3D printed try-in dentures were placed in the patient's mouth, occlusion, retention, stability, and esthetics were checked and corrected. On the final visit, CAD/CAM dentures were delivered in the patient's mouth.

【Results, Discussion】

Maxillary conventional overdenture and mandibular IOD with magnetic attachments can be fabricated using CAD/CAM technology for high strength and accuracy prosthesis.

Introduction

Computer-aided design and computer-aided manufacturing (CAD/CAM) technology has been applied to removable denture fabrication. CAD/CAM dentures can be fabricated with high precision by reducing because polymerization distortion is eliminated. This case was used CAD/CAM technology for maxillary conventional overdenture and mandibular implant overdenture (IOD) with magnetic attachments.

Patient's characteristics

The patient was a 65-years old female with partially edentulous maxillary jaw including dental root fractures #23 and #26 and fully edentulous mandibular jaw including dental implant fractures #47 (Fig. 1, 2). Maxillary and mandibular acrylic partial denture was worn for five years. Her chief complaints were unstable and difficulties of mastication using existing dentures. There was no significant medical history.

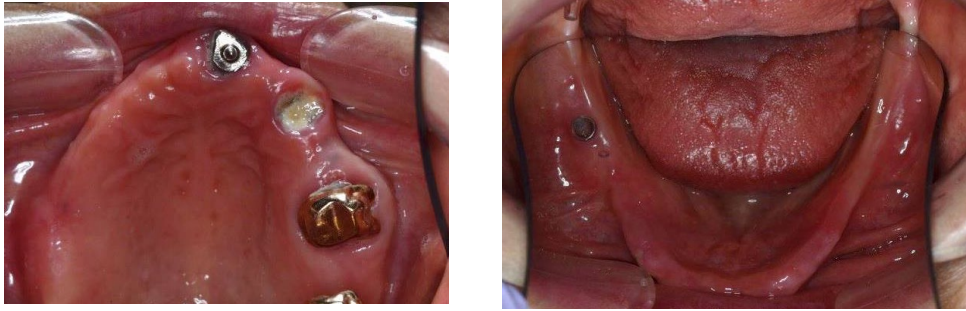


Fig. 1 Intraoral photograph at the first visit

Treatment progresses

- | | |
|----------------|--|
| 2017/ February | • First visits |
| April | • Extraction of #23, #26 teeth, and remove of #47 implant. |
| July | • Two implants (Magfit MIP fixture, PLATON, Japan) were placed in the regions of # 33 and # 43 |
| November | • Definitive impressions of both maxilla and mandibular jaws were made and the maxillomandibular relationship was recorded.
• 3D printed try-in dentures were placed in the patient's mouth, occlusion, retention, stability, and esthetics were checked.
• CAD/CAM dentures were delivered to the patient's mouth.
• Magnetic attachments (Magfit MIP, PLATON, Japan) were set on the CAD/CAM denture. |

Implant placement

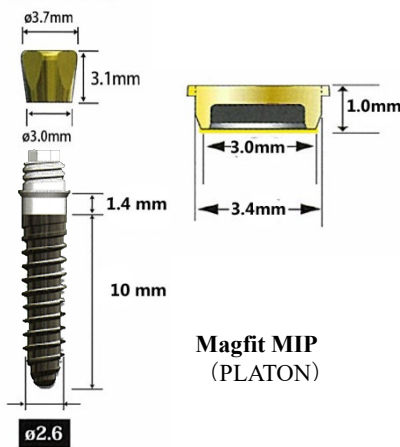


Fig. 2 Shema of Mini implant and magnetic attachment

Mini dental implant has been applied as a convenient treatment option for edentulous patients in cases where standard-sized Implants cannot be placed for economical and/or anatomical reasons

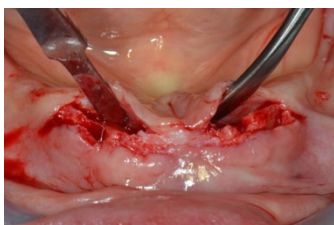
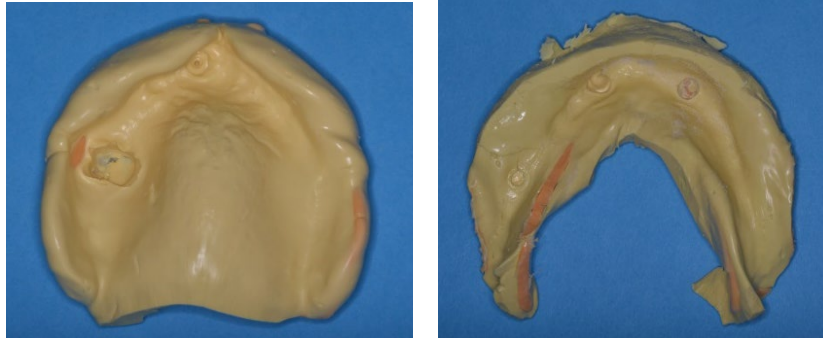


Fig. 3 Two mini implants were placed at canine regions.

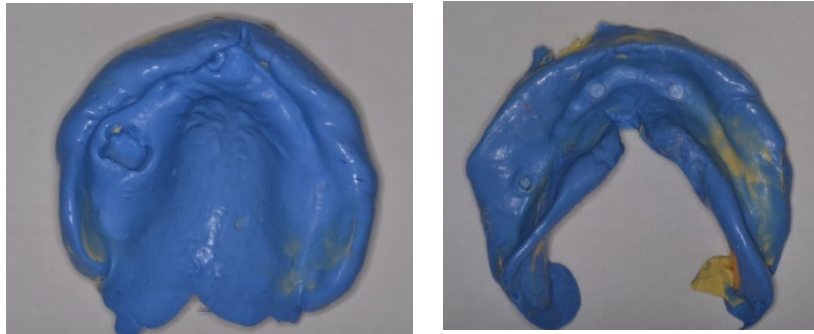


Fig. 4 Magnetic attachment keepers (Magfit MIP flat keeper, PLATON) were set on the implants.

CAD/CAM dentures were fabricated using DENTCA system



a: Use hard flow polyvinyl siloxane impression material for first impression



b: Apply medium flow polyvinyl siloxane for wash impression. Seat and border mold to capture anatomical landmarks.

Fig. 5 a,b Definitive impressions of both the maxilla and mandible were made with a double impression technique using polyvinyl siloxane impression materials (Exafine, hard and medium flow types; GC Corp) with custom trays (DENTCA tray, Size M; DENTCA Inc).

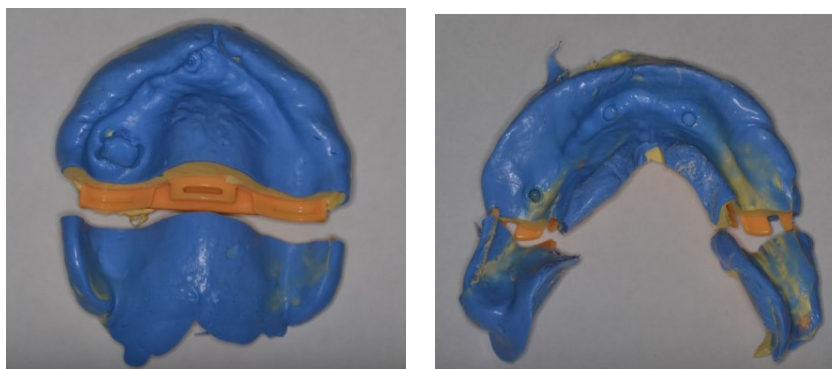


Fig. 6 Both impressions were sectioned and separated anteroposteriorly



Fig. 7 Gothic arch was traced, and the maxillomandibular relationship was registered using the anterior portions of the impressions.

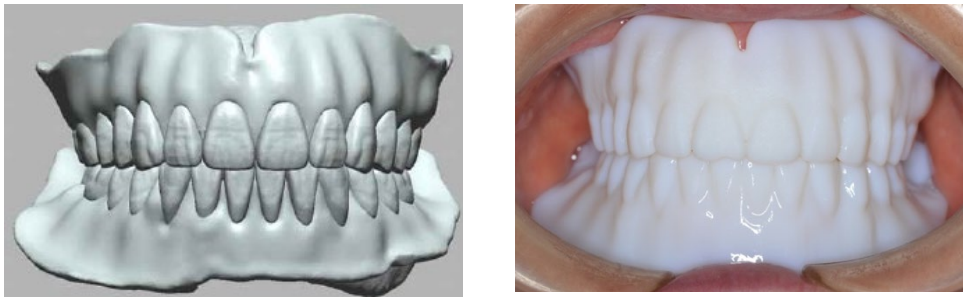


Fig. 8 Virtual teeth were automatically arranged according to average positions of anatomical landmark using a digital design system (PreForm v1.9.1 CAD software; DENTCA Inc). 3D printed try-in dentures were placed in the patient's mouth, occlusion, retention, stability, and esthetics were checked and corrected.

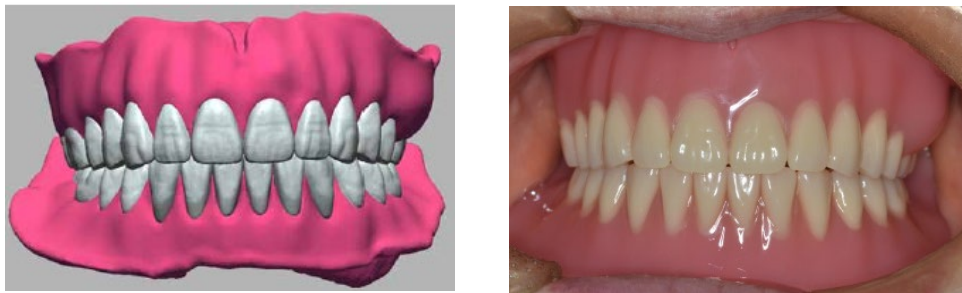


Fig. 9 Maxillary and mandibular complete dentures was milled from acrylic resin block and commercially available denture teeth were bonded with resin adhesive.

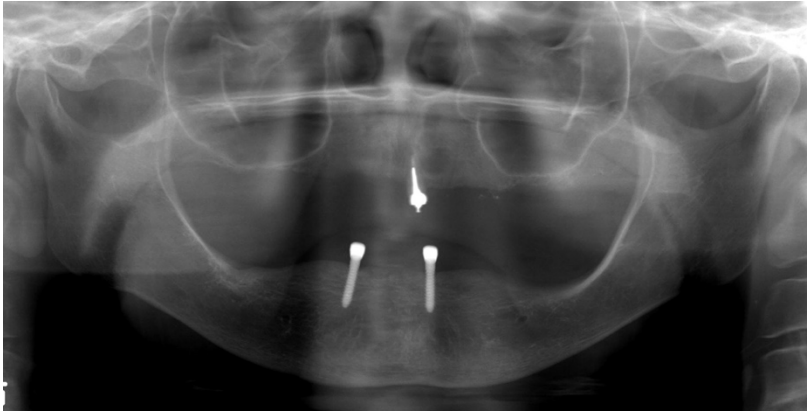


Fig. 10 Panorama radiograph at the postoperative visit

Results and Discussion

Maxillary conventional overdenture and mandibular IOD with magnetic attachments can be fabricated using CAD/CAM technology for high strength and accuracy prosthesis. Sufficient retention and stability could be provided by the magnetic attachments, and satisfactory aesthetic and function could be achieved using the DENTCA system.