



## GUIDED ALL-ON-6 IMPLANT RETAINED PROSTHESIS FOR MANDIBULAR ARCH REHABILITATION- A CASE REPORT

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### ABSTRACT

Tooth loss is a widespread concern. Prosthetic rehabilitation by all-on-6 implant placement is a widely used procedure for full arch rehabilitations. It requires proper case selection with availability of sufficient bone and interarch space for fabrication of implant retained prosthesis. Although research into dental implant designs, materials, and processes has increased in recent years and is expected to continue. A computer-guided surgery is preferable for controlled and precise implant placement. Also, the exact implant angulations can be visualized to provide the best possible aesthetics and occlusion. Surgical guide can be used to perform a flapless surgical implant placement, reducing post-operative trauma. This case report describes the prosthetic rehabilitation of the mandibular arch by flapless surgical placement of six implants using a surgical guide and rehabilitated by hybrid prosthesis.

### INTRODUCTION

Tooth loss is always a challenge for patients as it leads to loss in functionality and adds on the psychological and social stress. Rehabilitation of full or partial edentulous arches with conventional techniques such as removable complete or partial dentures and fixed partial dentures often fails to meet the demands of the patients in the age of advancing technology. However, rehabilitation using dental implants, preserve bone loss, restore bite forces, enables natural speech, improve functionality, improve self-esteem.<sup>1</sup>

Implant placement has also evolved in terms of surgical placements and prosthesis fabrication. Conventional implant planning is based on clinical examination and two-dimensional radiographic imaging which can result in poor implant location and angulation often not corrected by prosthesis.<sup>2</sup> However, Three-dimensional radiographic imaging such as CBCT allows for a more accurate diagnosis, treatment planning and helps in fabrication of surgical guide by three-dimensional (3D) printing. It further optimizes implant location, improve the functional and aesthetic outcome of the prosthesis, and reduce operative time and post-operative discomfort.<sup>3,4</sup>

Surgical guide replicates the virtually planned position in patient's mouth. It has sleeves that correspond to the diameter of drills or implants.<sup>2</sup> The surgical guide is tooth supported, mucosa supported, or bone supported which is supported by the teeth is more accurate than that is supported by the mucosa.<sup>6,7</sup>

This case report describes the prosthetic rehabilitation of the mandibular arch by flapless surgical placement of six implants using a surgical guide and rehabilitated by hybrid prosthesis.

### CASE REPORT

A 39-year-old male patient reported to the Department of Prosthodontics and Crown & Bridge with the chief complaint of difficulty in chewing food in the past two years. The patient is not suffering from any systemic illness. On clinical examination, the extraoral examination showed slight loss of vertical dimension, face was bilaterally symmetrical, there was no any midline deviation, wrinkling around the mouth was absent. The intraoral examination of patient showed high well round complete edentulous maxillary and mandibular arches, healthy mucosa and interridge distance was also in normal range (Figure1). Patient was more inclined to have fixed prosthesis. Various implant-based full mouth rehabilitation techniques were elaborated. Patient was advised for cone beam computed tomography (CBCT) for further diagnosis and treatment planning (Figure2). Adequate bone height and width were recorded for implant placement in mandibular arch. All-on-6 with implant retained prosthesis was planned for mandibular rehabilitation after proper clinical and radiographic evaluation. Temporarily conventional maxillary denture was planned because of patient's financial constraints. Six implants of 4.1 × 10 mm size were planned in 31,33,36,41,43,46 regions of mandibular arch. The patients gave his consent for the same.

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Figure 1 Complete edentulous maxillary and mandibular arches



Figure 2 a,b,c CBCT based implant planning

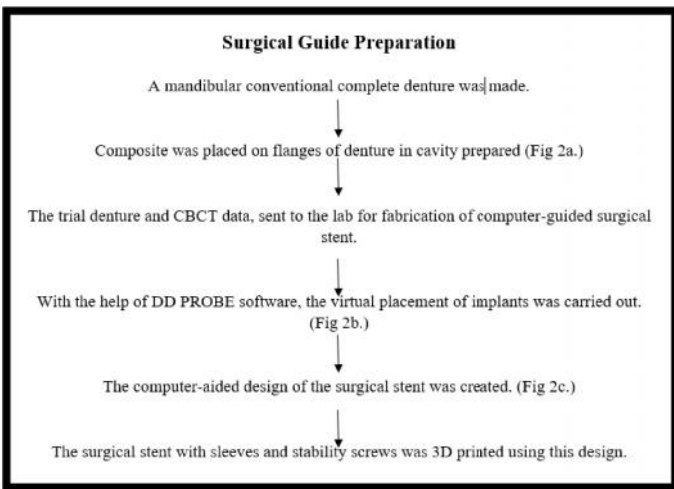


Figure 3 Surgical guide preparation

**Surgical Procedure**

Routine blood examination was done for the patient and results were found to be within normal limits. Flapless implant surgery was performed using the surgical guide (Figure 3). The local anaesthetic was administered at the required sites. The surgical guide was fixed and stabilised with the help of fixation screws (Figure 4a). A tissue punch was used to perforate the gingival tissue to gain access to bone (Figure 4b). The osteotomy was performed by sequential drilling and the implants were placed through the sleeves of the surgical guide and multiunit abutment were placed (Figure 4 c, d). Orthopantomogram (OPG) was taken after the implant placement (Figure 5).

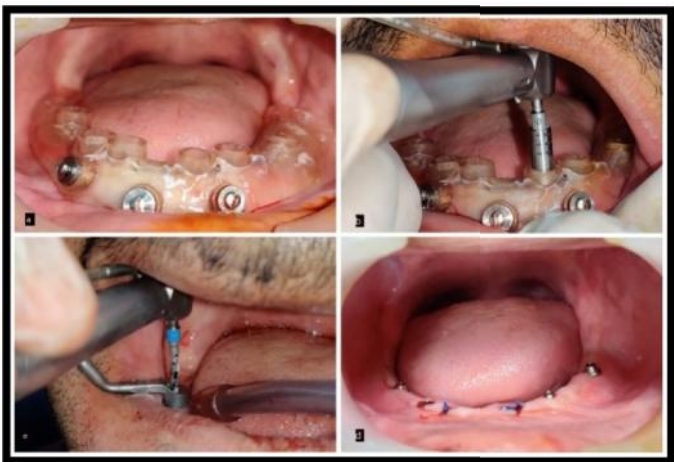


Figure 4 a. Surgical guide fixation, b. Tissue punch, c. Osteotomy sequential drilling d. Implant placement with multiunit abutment

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Figure 5 Postoperative OPG

**Prosthetic Phase**

After 3 months, the prosthetic phase was carried out. Primary impression was made with irreversible hydrocolloid (Zelgan, Dentsply) and primary cast was poured for custom tray fabrication. An open tray impression was made with a polyvinyl siloxane putty and light body impression material (addition silicone, GC Flexceed) for the fabrication of the master cast. Verification jig was made after splinting of impression copings using dental floss and pattern resin (GC America). The jig trial was checked using Sheffield's test and found to be correct in patients' mouth (Figure 6a). Direct Metal Laser Sintering (DMLS) bar was made and this bar was tried intraorally (Figure 6b). The face bow transfer and jaw relation were recorded and master casts were mounted on semi adjustable articulator (Hanau™ Wide-View, Louisville, KY, USA). Teeth arrangement was done by following balanced occlusion principles. Try-In was found to be correct (Figure 6c). The final maxillary conventional denture insertion was done and mandibular hybrid prosthesis was fixed at 25 Ncm torque. Passive fitting of final prosthesis was checked before tightening of implant screws. Occlusion was checked at both centric and eccentric movements. All the deflective contacts were removed and implant holes filled with teflon and light cure composite (Figure 6 d). The follow-up of the patient was done after 1 week and the patient was kept on a regular 3-month recall appointment.



Figure 6.a. Verification of Jig trial, b. DMLS Bar trial, c. Try In, d. Final prosthesis

## DISCUSSION

The trend in implant dentistry today is mainly toward the rapid and simplified procedure. Computer-guided surgery is often associated with flapless implant insertion. It simplifies the implant drilling procedure and implant placement. The flapless surgical approach has advantages of improved postoperative healing, less stressful surgical procedure, less injury to soft tissues, as well as reduces the postoperative bleeding and pain.<sup>8</sup>

Based on the research, we can conclude that computer-guided surgery has a high level of accuracy which allows for the avoidance of major complications such as invading nerves or crucial vessels on the one hand, and these protocols can even be applied for complicated instances like severe bone atrophy.<sup>9</sup> In hybrid prosthesis acrylic acts as an intermediary between the porcelain teeth and metal substructure, the impact force during dynamic occlusal loading also may be reduced. Hence, hybrid prostheses are indicated for implant restoration in large crown height spaces as a general rule.<sup>10</sup> The other important factor during the manufacturing of implant-supported hybrid prosthesis is obtaining a passive fit of the framework. Without the passive fit, mechanical or biological complications such as peri-implant bone loss, screws loosening or fracture of abutment or the implant were reported.<sup>11</sup>

Maxillary arch of patient was well round having adequate bone height and width and as already mentioned, all-on-6 Implant retained prosthesis have lots of benefits but patient didn't want fixed prosthesis for maxillary arch due to cost factor.

## CONCLUSION

All-on-6, Computer-aided design (CAD)/computer-aided machining (CAM) based surgical templates that incorporate drill housings helps in precise placement of implants even without flap elevation. Less intraoperative bleeding, decreased postoperative patient discomfort and better wound healing are the advantages of flapless implant procedure.

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