

Implant-Supported Hybrid Prosthesis using All on Six Concept for Atrophic Ridges with Severe Gag Reflex - A Case Report

ABSTRACT

Aims: Edentulism is correlated to poor self-esteem and depression in both young and old individuals due to social rejection. For edentulous patients who are not interested in removable prosthesis, implant-supported fixed prosthesis might be an appropriate treatment modality. The aim of this case report is to rehabilitate the completely edentulous patient with severe gag reflex by maxillary implant supported hybrid prosthesis and mandibular conventional complete denture.

Presentation of case: A 58 years old female patient had reported to the outpatient wing of department of prosthodontics with chief complaint of missing teeth in maxillary and mandibular arches. Patient had a history of severe gagging and discomfort with old denture. The treatment progresses as six implant placed and hybrid prosthesis was fabricated in maxillary arch and conventional complete denture was fabricated in mandibular arch and delivered to the patient.

Discussion: Implant-supported complete arch rehabilitation can be accomplished with either a fixed or removable prosthesis. For a satisfactory outcome, proper patient selection, accurate surgical procedure, and meticulous prosthetic planning are required. Cement-retained implant restorations are becoming more popular because they are simple, aesthetic, and cost-effective. However, such restorations are hard to retrieve, and any residual cement in the soft tissue around the implant might cause peri-implant illness.

Conclusion: A screw retained fixed prosthesis was planned for this patient in maxillary arch and conventional complete denture in mandibular arch which gave a successful outcome and avoid gag reflex.

Key words: *All on six concept, Complete edentulism, Implant supported fixed denture, Implant supported overdentures, resorbed ridges.*

1. INTRODUCTION

Geriatric people typically have partial or complete edentulism, which impairs their masticatory efficiency and leads to decrease in overall health and quality of life. Because of their inability to properly masticate and communicate, edentulous individuals are classified physically incompetent, disabled, and handicapped by WHO guidelines. According to Peltzer et al., the prevalence of edentulism among old aged population in India is 16.3 percent^(1,2).

Conventional complete dentures are the most common prosthetic treatment of choice for edentulism because they enhance comfort, aesthetics, occlusal and facial support, masticatory function, and speech; nevertheless, retention, stability, and support are still issues with resorbed ridges. Full-arch implants rehabilitation is the alternative option for such patients which incorporates a series of 4-8 dental implants

to restore an entire arch of missing teeth. Once these implants have been placed and osseointegrated, it can be loaded with fixed or removable implant-supported dentures that attach onto the implants. Full-arch implants also help strengthen and protect the jaw bone, preventing bone resorption after tooth loss. They will enhance the patient satisfaction and comfort and quality of life ⁽³⁾.

The major drawbacks of implant dentistry are complex procedure, larger treatment time and expensive. Advances in implant dentistry now provides optimal cost-benefit ratio by invention of "all on 4" and "all on 6" implant rehabilitation procedures which allows for the same advantage of aesthetics and support that can be obtained from traditional implants with reduced expenditure and number of visits ⁽⁴⁾.

Hence, in this case report, a rehabilitation of completely edentulous patient with severe gag reflex by six implant screw retained hybrid fixed restoration for the maxillary arch and conventional complete denture for mandibular arch is discussed.

2. PRESENTATION OF CASE

A female patient aged 58 years had reported to the outpatient wing of department of prosthodontics, with chief complaint of missing teeth in maxillary and mandibular arches. History revealed that patient had got her teeth extracted 5 years back because of mobility. Patient was an old denture wearer and was not satisfied because of poor retention and severe gag reflex which made her difficult to masticate food properly. General examination revealed no relevant medical history. Patient was philosophical with normal posture and gait. On extraoral examination, patient had bilaterally symmetrical face with competent lips. On intraoral examination, patient had completely edentulous maxillary and mandibular arches with normal attached gingiva without any flabby tissues and ulcerations (Fig 1.B,C&D).

2.1 Treatment plan

Patient was given treatment options like conventional complete denture, implant supported/retained prosthesis. Considering the patient's clinical situation and financial status and also considering the gagging, an implant retained hybrid prosthesis for maxillary arch and conventional complete denture for mandibular arch was planned. Patient has agreed for the treatment option and informed consent was taken.

2.2 Treatment progress

2.2.1 Pre-surgical phase

Patient was asked to undergo routine medical examinations like complete blood count, blood pressure, blood sugar levels. All the reports were normal, and then patient was advised for CBCT of maxilla to evaluate quality and quantity (length and width) of the alveolar bone. After evaluating CBCT of maxilla, totally six implants (ADIN IMPLANTS) were planned (i.e) two anterior implants (4.2x11.5mm, 3.7x11.5mm) in canine region, two implants (3.7x11.5mm, 3.7x11.5mm) in 1st premolar region and remaining two posterior implants (4.2x10mm, 4.2x11.5mm) in molar region (Fig 1. E&F). The implant placement was strategically decided to avoid cantilever position in final prostheses. Diagnostic impression was made using irreversible hydrocolloid impression material and impression was poured using type III gypsum product. Patient was pre-medicated with appropriate oral antibiotic and analgesics a day before surgery.

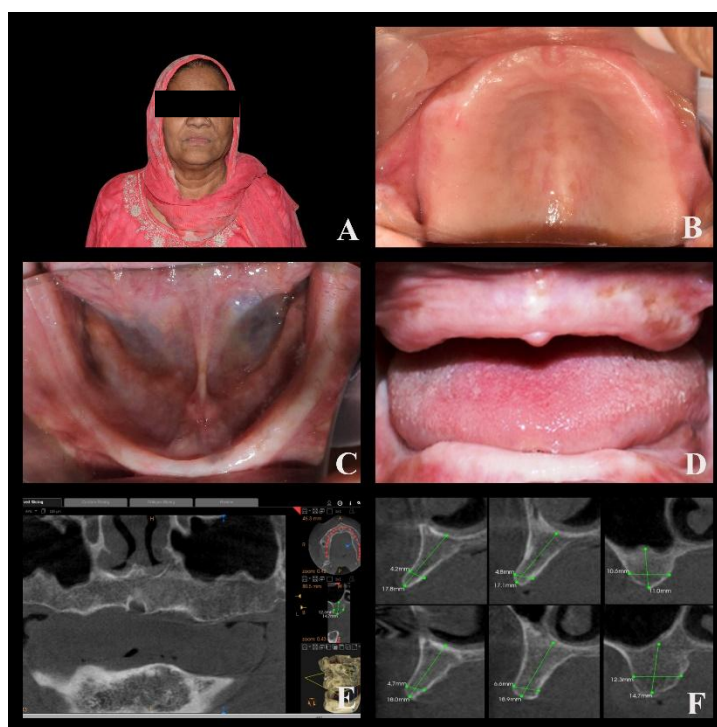


Figure 1: A. Pre-rehabilitative view B. Maxillary intraoral view C. Mandibular intraoral view D. Inter-arch relation E. CBCT of maxilla F. Available bone quality (width and height)

2.2.2 Surgical phase

On the day of surgery, the procedure and its consequences were explained to the patient. All the surgical instruments and physiodispenser were kept ready and the surgical site was prepared using gauze piece dipped in betadine. 2% lignocaine and 1:100,000 adrenaline was administered as bilateral infraorbital nerve block, posterior superior alveolar nerve block, nasopalatine nerve block and greater palatine nerve block (Fig 2 A). A crestal incision was given by using BP blade no.15 extending from molar region of 1st quadrant to 2nd quadrant (Fig 2 B). Then by using periosteal elevator the muco-periosteal flap was elevated (Fig 2 C). The drilling procedure was initiated, the first drill was carried out by using pilot drill (Fig 2 D). After pilot drill of each site, the paralleling pin was placed inside the drilled site and evaluated for parallelism (Fig 2 E&F). Then the subsequent drilling was completed followed by which six implants (4.2x11.5, 3.75x11.5, 4.2x10) were placed using implant driver and healing abutment were screwed using hex driver (Fig 2 G). Implant stability was sufficient (35-45 N/cm measured with a torque spring) for all 6 implants. Multiple single interrupted suture were placed using reverse circle 3-0 silk suture (Fig 2 H). The appropriate oral antibiotics and IM analgesics were also given. Post-operative radiograph (Orthopantomogram) was taken for evaluating implant placement and adjacent vital structures (Fig 2 I). After 1 hour patient was again re-evaluated for bleeding or pain, after which postoperative instructions and medications were given and discharged.

Patient was recalled for a subsequent follow-up on the next day, 3rd day and after a week. After approximation of incision line, the suture removal was done after a week. Patient was asked to have soft diet and recalled after 6 months for prosthetic phase.

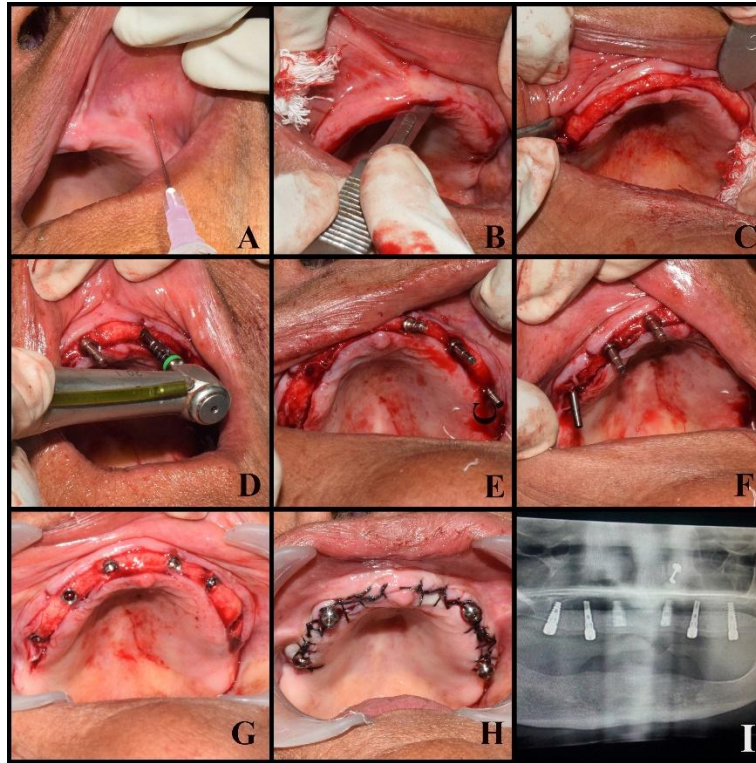


Figure 2: A. Local anesthesia B. Crestal incision C. Muco-periosteal flap elevation D. Implant drilling E&F. Paralleling pin evaluation G. Implant placed H. Silk suture (3-0) placed I. Orthopantomogram taken after implant placement.

2.2.3 Prosthetic phase

Six months later, patient was recalled for the second stage and prosthetic rehabilitation was conducted. The implant sites were evaluated for complete healing and checked for signs of inflammation (Fig 3 A). One anterior implant on right side was not osseointegrated adequately hence it was removed before prosthetic fabrication. The healing abutment of remaining implants were removed, and the appropriate impression copings were selected for closed tray impression technique. Five closed tray impression copings were screwed and impression was taken using addition silicone putty and light body elastomeric impression material (Fig 3 B&C). Then the impression copings were removed and implant analogs were attached to it and placed in the impression in its respective position and the impression was poured using type I dental stone. Then the required abutment were placed over the implant analog in the cast and jigs were fabricated using pattern resin and metal rods (Fig 3 D). The jig trial was done to verify that the master model is accurate before fabrication of metal framework and also to ensure the fitting of the final frame (Fig 3 E). Meanwhile the conventional primary and secondary impression was taken for mandibular arch and master cast was poured using dental stone. The maxillary and mandibular jaw relation record was taken and articulated in a semi-adjustable articulator and teeth arrangement was done (Fig 4 A). The trial denture was placed in patient mouth and evaluated for balanced occlusion (Fig 4 B). With this occlusion, bite forces will be primarily compressive in nature to the prosthesis, implants, and to the bone. Then the final denture was fabricated using heat polymerizing acrylic resin by conventional dewaxing and curing. The final maxillary hybrid implant prosthesis was placed in position, abutments were screwed and the holes were blocked using composite resin (Fig 4 C&D). The mandibular denture was also placed and evaluated for retention, stability and occlusion.

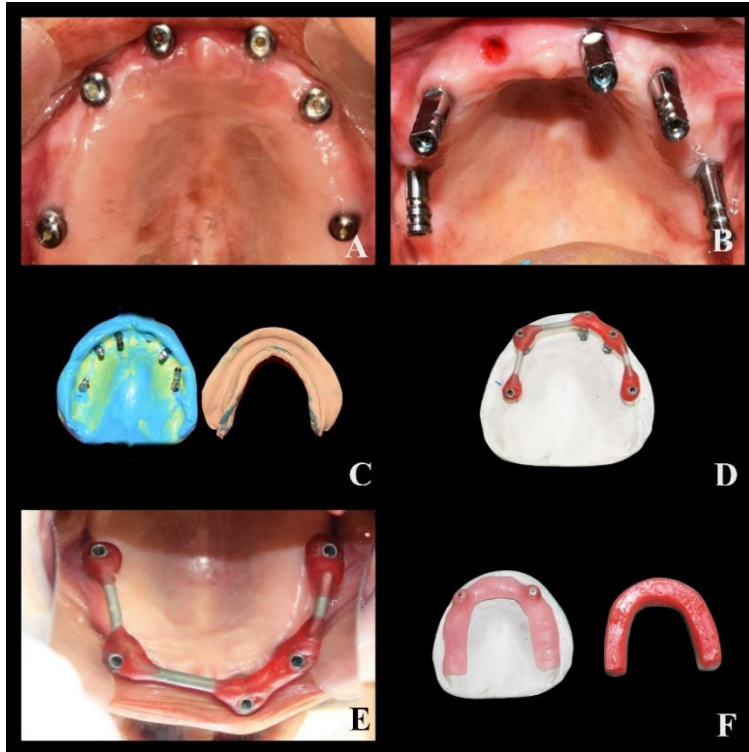


Figure 3: A. Implant evaluation after six months B. Closed impression tray placement for impression C. Final impression D. Fabrication of Jig E. Jig trial F. Occlusal rim fabrication for jaw relation (2-piece occlusal rim)

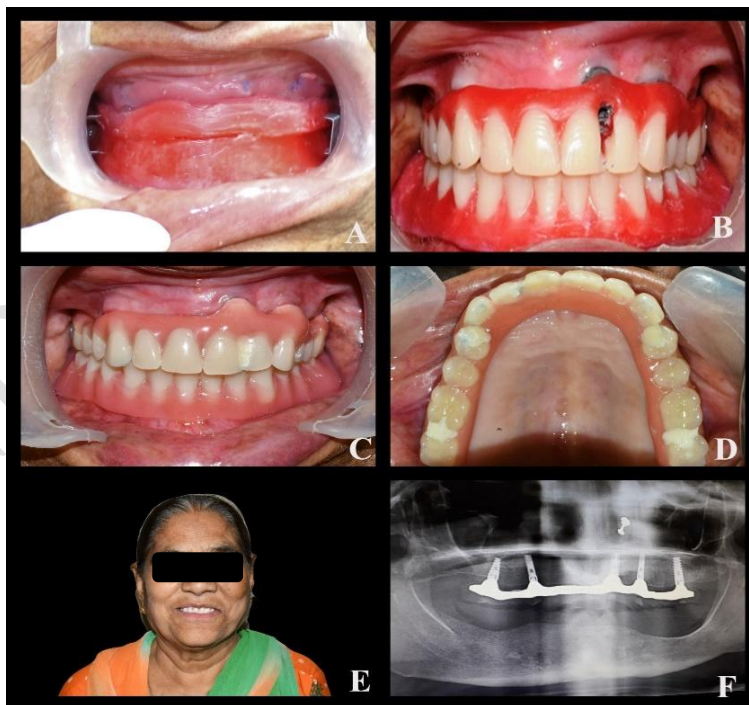


Figure 4: A. Maxillo-mandibular jaw relation B. Trial denture try-in C. Final hybrid prosthesis in situ D. Final hybrid prosthesis occlusal view E. Post-rehabilitative view F. Post-rehabilitative radiograph

2.2.4 Post-rehabilitative instructions

The post-rehabilitative instructions were given to the patient and recalled for periodic follow up (Fig 4 E&F).

3. DISCUSSION

Dental implants are widely used and are regarded as one of various therapeutic choices for replacing lost teeth. They are considered a significant contribution to dentistry, particularly in compromised ridges, since they have changed the way missing teeth are restored, with a high success rate because they osseointegrate with the surrounding bone. Implant-supported dentures are a life-changing rehabilitative treatment for many older persons. There are two forms of implant-supported dentures: implant-supported overdentures and implant-supported fixed dentures^(5, 6).

When compared to a conventional complete denture, an implant-supported overdenture requires fewer dental implants for rehabilitation and provides appropriate retention and comfort. However, the disadvantages include an unnatural appearance, a lack of psychological satisfaction due to the fact that it is removable, and it is relatively bulkier⁽⁷⁾. For such patients, implant-supported fixed restoration is the treatment of choice, because it has the advantages of a natural appearance, fixed, does not fully cover the palatal region and thus is suitable for gagging patients, no need to remove it for cleaning, and withstands maximum masticatory forces⁽⁸⁾.

By the introduction of "all on 4" and "all on 6" concept, the rehabilitation of resorbed ridges was done without any bone augmentation procedure, by using distal tilted implants the cantilever length was decreased. Both cylindrical and tapered implants can be used for these procedures which was also explained in a systematic review conducted by Markadam Antal et al that the tapered profile implants have a favorable bone response compared to cylindrical implants⁽⁹⁾.

In a systematic review conducted by Shahinaz Sayed Mohamed Hassan et al states that the all on 6 implant concept is recommended for restoration of atrophied maxilla as it has high success rate less plaque accumulation and pocket formation, less crestal bone loss and increased stability after 12 months of replacement compared to All on 4 implant concept⁽¹⁰⁾.

The limitations of the implant techniques used for these patients are time consuming, blood loss, discomfort during and after procedure, increased healing period and no provisionalism. These drawbacks can be rectified due to invention of CAD\CAM and 3D printed surgical guides which provides optimal implant placement according to the correct prosthetic position and minimize intraoperative trauma and procedure time. But still the surgical guides has their own drawbacks like increased cost and chances of bone necrosis because of its placement, hence we opt for conventional implant placement. The usage of multiunit abutment system allows the clinician an accurate and passive fitting of screw-retained full-arch construction immediately after surgery as a temporary prosthesis. After 3 months, the permanent screw-retained prosthesis can be fabricated^(11, 12). But still the immediate and early loading has more failure rate compared to conventional loading especially in full arch rehabilitation, hence we opt for delayed loading of implants.

4. CONCLUSION

Full arch rehabilitation with five to six implants in the maxilla has becoming a popular approach among the implant clinicians. An increase in the antero-posterior spread and number of supporting implants increases the predictability of successful outcome of all on 6 implant procedure. Therefore, in the present case, six implants were placed in the maxillary arch in order to provide complete fixed rehabilitation and also to avoid the complete palatal coverage which will avoid gag reflex in the patient. After healing period, even though one implant had been failed there was no consequences in prosthetic fabrication as compared to all on 4 procedure and overdentures which can't be rehabilitated because of more distal

cantilever. This type of rehabilitation will provide an alternative modality for patients with compromised ridges and discomfort with conventional complete dentures.

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