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Oral Rehabilitation by Maxillary Implant Supported Hybrid Denture

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ABSTRACT
A fixed acrylic dental prosthesis that restores aesthetics, lip support, and speech and is held in place by implants is known as an implant-supported hybrid prosthesis. The rise in aesthetic standards is a significant contributor to the implant-supported prosthesis' high success rate. This clinical study intends to describe the prosthetic rehabilitation with implant-supported hybrid prosthesis in terms of both aesthetics and functionality.
Keywords: *Implant-supported hybrid prosthesis, Overdenture, Osseointegration.*

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INTRODUCTION

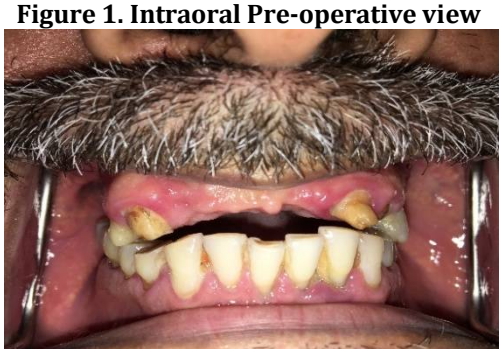
Implant supported FPD is mainly preferred over complete dentures to enhance retention, stability and improving speech difficulties and chewing efficiency and to obtain the natural smile by preserving the soft tissue anatomy [1]. The goal of getting a good smile is a major issue for most patients who have lost their teeth and the alveolar bone that supported them, and treatment choices range from using removable dentures supported by implants to using fixed dentures supported by implants [2]. When compared to a complete denture and a conventional fixed prosthesis, overdentures supported by implants and hybrid prostheses provide support to the soft tissues of the face[3].Implant supported fixed prosthesis is preferred choice over dentures as they are more stable and comfortable to the patient and they help in esthetics, phonetics and hygiene maintenance and restores natural appearance [3]. When opposed to the edentulous mandible, the edentulous maxilla has lower bone quality, which makes placing implants more challenging. The maxilla's bone volume varies throughout, and it can be corrected using a variety of techniques, such as grafting, slanted implants, or extraalveolar implants like pterygoid and zygomatic implants [4].

Pink porcelain, which is used in conventional prostheses, is less esthetic and typically takes longer baking cycles which raises the potential for porcelain fracture. Hybrid prostheses are a fantastic alternative for replacing soft tissue [5]. In contrast to fixed bridges supported by implants, hybrid prosthesis repair lost alveolar height using pink acrylic resin used to keep teeth in place. Hybrid prosthesis can be effectively implanted using a combination of slanted and axially placed implants in the posterior half of a resorbed maxilla have high cosmetic outcomes, economic effectiveness, and a reduction in the impact force of dynamic occlusal stresses [6]. Because porcelain teeth generate stress inside the framework and acrylic denture teeth readily wear off, veneer materials have been generally accepted in implant dentistry because they have the capacity to absorb stress and have reduced wear characteristics [7].

CASE REPORT

A 55-year-old man sought full maxillary prosthetic oral rehabilitation at the Department of Prosthodontics, Faculty of Dental Sciences, SGT University. The patient's maxillary teeth were scarce. Except for the left-side first molar, all of the teeth in the lower arch were present (Figure-1). Three treatment options a conventional maxillary denture, Overdentures supported by implants or hybrid dentures supported by implants were offered to the patient following clinical and radiological evaluations that took into consideration the labial support and bone loss. The hybrid denture supported by implants was approved by the patient.

Figure 1. Intraoral Pre-operative view



Surgical Phase

Following radiographic and clinical assessments, including CBCT, it was chosen to extract few remaining teeth on the same day and then place the implants in the maxillary region. Thus, five titanium implants (ADIN Implants) were put in in accordance with the directions from the manufacturer. Implant sites were 11, 21, 14, 15, and 25. (Fig-2). The surgical site was stitched up (Figure-3) and allowed to recover completely under water. An osseointegration time of four months was followed by a two-stage procedure, and healing abutments were implanted through a palatal crestal incision. It was possible to get connected tissue and close the flap without strain around the healing abutments by coronally repositioning a flap from the palate soft tissue. The patient received a traditional denture for mastication and aesthetics (Figure-4).

Figure 2: Implant placed

Figure 3: Sutures placed

Figure 4: Conventional maxillary denture

Prosthetic Stage

The prosthetic phase was initiated once radiographic analyses demonstrated that the bone and implant fixings have successfully fused. After second round of surgery the abutments' surrounding soft tissue after healing was given two to three weeks to mature. Alginate imprints of the maxilla and mandible were used to create a bespoke, an open-tray transfer impression is made. After the healing caps were taken off, the primary custom tray was checked in patient's mouthand the implants had open-tray impression copings (Figure-5) attached to them. (Figure-6)With the use of pattern resin, these copings were splinted, and a Jig trial was carried out inside the patient's mouth. (Figure-7) Around the transfer copings, light-body addition silicon impression material was injected, and impression was created using putty addition silicon material. The wax-up underwenttry-in for the evaluation of the occlusal vertical dimension and assessment of aesthetic appearance. A complete denture try-in using acrylic teeth was created to map out

the placement of the future teeth. (Figure-8) This configuration serves as the face border for the upcoming wax-up that is planned, and it also aids in creating a computerized design for this hybrid prosthesis that encourages eventual restoration. For the quantitative evaluation of the occlusal vertical dimension and evaluation of the aesthetic appearance, the wax-up underwent a try-in. A CD try-in using acrylic teeth was created to map out the placement of the future teeth. (Figure-8).This configuration serves as the face border for the upcoming wax-up and aids in creating the computerized design for the hybrid prosthesis that will be used for the final restoration.

Figure 5. Open Tray Transfer Copings **Figure 6. Maxillary Impression**

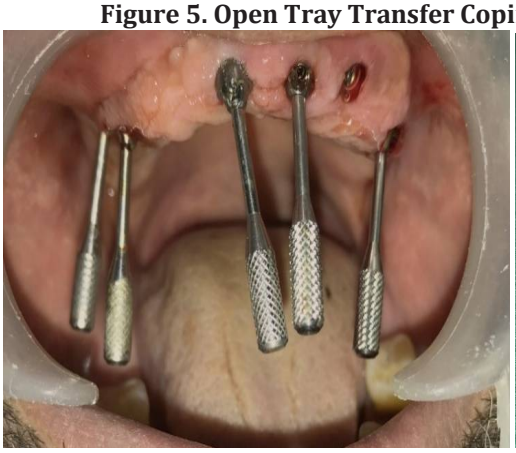
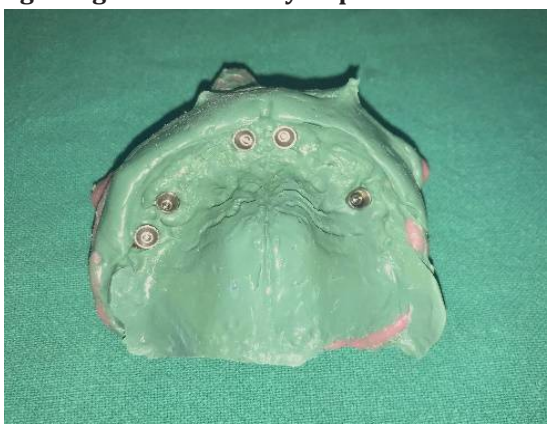
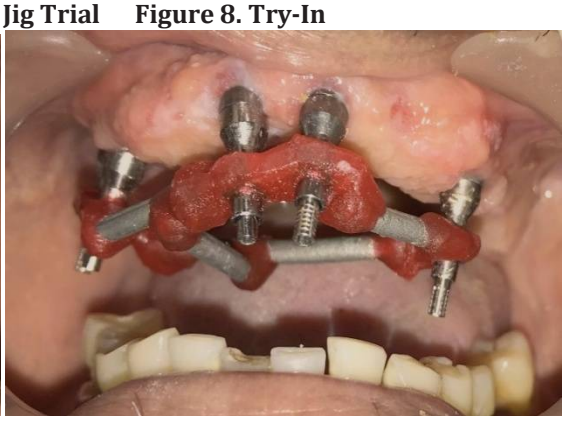



Figure 7. Verification of Jig Trial **Figure 8. Try-In**

Using occlusal screws and a torque wrench, the maxillary hybrid prosthesis was secured with implant abutments at 11, 12, 14, 15, and 25. (Figure-9) The prosthesis was finished and polished after the access holes were sealed with composite buildup, and occlusal adjustments were done with articulating paper. The patient received the finished prosthesis. The patient received customary post-insertion recommendations for upkeep of oral hygiene (Figures 11-12). After a month and again after six months, the patient was brought back for a review.

Figure 9. Hybrid Prosthesis

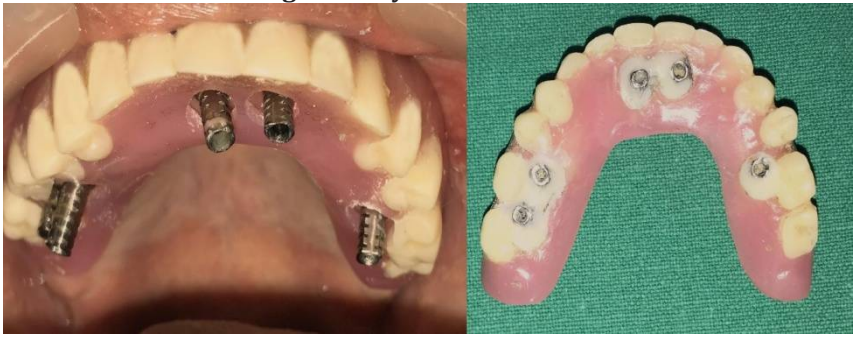
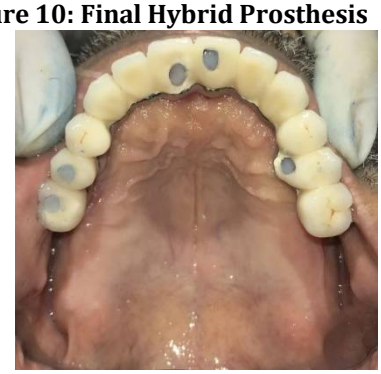


Figure 10: Final Hybrid Prosthesis **Figure 11: Final Post- operative View**



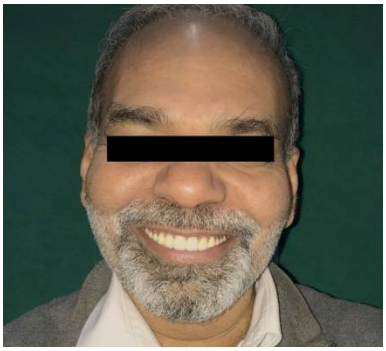



Figure 12 : Final Prosthesis

RESULTS AND DISCUSSION

After the prosthesis was delivered, routine clinical evaluations were conducted at 1, 2, 6, and 12 months. Thereafter, visual and radiographic exams were performed yearly. Success is dependent on the implant's stability (lack of motion), lack of discomfort or pain or any other subjective feelings at every visit, the absence of peri-implant abscess or infection and no persistent radiolucency surrounding the implants.

Over the course of the 3-year follow-up, no implants in the patient experienced failure following prosthetic rehabilitation, and the patient continued to operate with a fixed prosthesis. The hybrid prosthesis helped the patient speak more clearly, maintain good cleanliness around the new device, and chew food more effectively. The patient was happy with the care he received, and his optimistic outlook helped him have a good prognosis. The aesthetic benefits of hybrid prostheses include their ability to disperse force, act as a shock absorber, and lessen the sudden stress on implants. For accurate and exact planning in implantology, any clinical challenge should be identified before treatment, as should the anticipated outcome [8].

The intra-arch space between the denture teeth, acrylic resin, metal substructure, and implant components influences the choice of restoration greatly. Implant-supported hybrid prostheses should be manufactured with the framework passively fitted. Mechanical or biological issues including bone loss around the implant, screws coming free, or abutment or implant fractures have been recorded without the passive fit [9].In place of artificial teeth made of porcelain or acrylic, novel restorative materials like poly methyl methacrylate (PMMA) and urethane dimethacrylate (UDMA) incorporating composite are now being used.

Most frequent issues with the mandibular hybrid prosthesis were lost fillings in screw-access apertures and mobile prosthesis. Additionally, it was noted that the high rate of wear and fracturing of denture teeth in implant prostheses had a substantial negative impact on the prognosis [10].

Evaluations of the hardness & wear resistance of conventional acrylic denture teeth, cross-linked denture teeth, microfilled composite teeth, and nanocomposite denture teeth were conducted. It was discovered that the resistance of nanocomposite denture teeth was higher than that of acrylic resin, but lower than that of microfilled composite denture teeth [11].

For edentulous maxilla rehabilitation with implants, four implants at very least should be inserted (fixed or removable). At least 2 anterior axial implants and 2 posterior distally inclined implantsor six to eight axial implants evenly spaced throughout the anterior and posterior parts of the arch, can sustain a single-piece fixed full-arch dental prosthesis. A minimum of four to six implants should be inserted for an overdenture. The maxilla shouldn't be used for mini implants [12]. The long-term primary result of an

implant-prosthetic complex as a whole is success in implant dentistry [13].
To reduce stress on the hybrid prosthesis components, a number of variables should be considered, including the placement of implants correctly, the removal of cantilevers, exact occlusal correction, construction of solid framework, and use of stress-relieving materials. High stresses are created, leading to a variety of mechanical and biological problems, including component breakage, biological bone resorption, screw loosening, and employment of stress-reducing techniques to separate the veneering material from its framework. However, alternative materials can be used to make implant supported prostheses, which can decrease these problems by functioning as a force absorber and distributer.

CONCLUSION

The right diagnosis and treatment strategy are the primary requirements for a great outcome. A thorough evaluation comprises taking a complete medical &oral history, an orofacial & dental clinical evaluation and taking X-rays, primary impressions &relationship between the jaws for mounting castings. The meticulous integration and appropriate timing of treatment procedures have a direct impact on the outcome. Four, six, or more implants can be used to successfully treat maxillary edentulism. Advanced knowledge and thorough communication between the members of the therapeutic team are required for the procedural diagnosis & therapy planning with maintenance for these various techniques.

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