

## Implant supported Rehabilitation Using Hybrid prosthesis – A case report

<sup>1</sup>.Dr. Jagadesaan.N,<sup>2</sup>. Dr. Lambodaran. G, <sup>3</sup>.Dr.Radha.S, <sup>4</sup>.Dr.S.A.Mohamed Ali

1 .Dr.Jagadesaan N MDS, Associate Professor, Dept. of Prosthodontics & Implantology, JKKN dental college and hospital, Kumarapalayam, Namakkal, 638183, India.

2.Dr.Lambodaran G MDS, Associate Professor, Dept. of Prosthodontics & Implantology, MeenakshiAmmal dental college, Chennai 95, India.

3..Dr.Radha S MDS, Assistant Professor, Dept. of paedodontics, JKKN dental college and hospital, Kumarapalayam, Namakkal, 638183, India.

4.Dr.S.A.MohamedAli, Prosthodontist & Implantologist, Almana General Hospital, Saudi Arabia

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### ABSTRACT

*Esthetic and functional rehabilitation of completely edentulous maxillary arch with implant supported prosthesis is a challenging task. Newer technologies such as computer assisted design computer assisted milling (CAD CAM) and cone beam conventional tomography play an important role in achieving predictable results. This is a case report of rehabilitation of completely edentulous maxillary arch patient with a cad cam milled titanium bar implant supported hybrid prosthesis. In the first stage, five endosseous dental implants were placed. After integration impressions were made, CAD CAM milled titanium bar with ball attachment was fabricated followed by prosthesis fabrication.*

**Key words:** Computer- assisted design- computer- assisted milling, dental implants, hybrid denture,

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### I. Introduction:

The rehabilitation of maxillary arch is often challenging as compared to the mandibular arch because of high esthetic demands, type and density of bone, limited availability of bone due to the presence of sinus floor and nasal floor,[1] and anatomy of the maxillary arch which makes proper implant angulations difficult, especially in the anterior region.[1] The angulations of implants in the anterior maxilla sometimes make the rehabilitation tricky and influence the prosthesis selection. Various methods of full-mouth rehabilitation with osseointegrated implants have been discussed. Implant-retained removable overdenture, implant-supported cement-retained bridge, and hybrid denture to name a few.[2-4] Each of these methods has their advantages and disadvantages. In moderate to severe reabsorbed edentulous ridge cases, the implant-supported milled bar overdenture is a therapeutic option which offers many advantages over the metal porcelain fixed or the hybrid fixed-detachable prostheses. Implant-supported milled bar overdentures present a similar stability and retention to that of the fixed prosthesis, with the advantages of the removable ones. This article discusses stepwise fabrication of one such prosthesis prepared for maxillary arch rehabilitation.

### II. Case Report :

A partially edentulous, female patient aged 54 years reported to our dental office to get her missing teeth replaced. Her chief desire was to restore esthetics and better chewing. On clinical examination the patient had a completely edentulous maxillary arch and lower arch had teeth from 36 to 46 and the patient did not want to replace the missing lower posterior teeth. On CBCT examination in the left upper back tooth region the bone was found to be inadequate. After a thorough examination and investigation it was decided to Place five endosseous implants and restoring it by giving a CAD CAM milled titanium bar retained hybrid denture replacing till first molar. Since the patient was esthetically demanding and socially active, she did not want edentulous phase; hence, it was decided to fabricate maxillary denture which will also act as a diagnostic stent for cone beam conventional tomography (CBCT) as well as a temporary denture during the healing phase of osseointegration. The patient agreed with the treatment plan and informed consent was taken for the same. Radiopaque markers were placed in denture at prospective implant positions to convert the denture into a radiographic stent. The patient was sent for CBCT with the denture stent. After reading the CBCT, five prospective implant sites were identified and implants sizes were decided. The patient was evaluated and necessary blood investigations were carried out before the implant placement.

**Implant surgical phase:**

Following all the sterilization protocols, standard open flap surgery was performed under local anesthesia and five endosseous dental implants were placed (figure 1) in the maxillary arch. Sutures were removed after 7 days. During the integration phase, regular oral hygiene assessment was done. In this case, delayed loading protocol given by Branemark was followed. The implant site was allowed to heal for 6 months and during this period a temporary tooth supported prosthesis with soft liners was given to the patient.

**Prosthetic Phase:**

On examination after healing phase the distal implant in relation to right upper region there was severe bone loss and since the implant was mobile it was removed. Following this the cover screws were removed and they were replaced by healing abutments for two weeks (figure 2). After this a transfer impression was made using addition silicone [Figure 3]. The impression was sent to the laboratory. In the laboratory, master cast was poured in type IV dental stone with lab analogue. On the master cast, a verification jig was made with autopolymerizing and this was checked in patients' mouth for passivity. This step reassured the precise recording of implant positions. Following this CAD CAM milled titanium framework with ball attachment was milled and was checked intra orally for precise and passive fit (Figure 4,5). Once the fit of framework was found satisfactory, a pickup impression of the framework was done for the fabrication of framework attachment. Then bite registration was done and the trial denture was then checked for esthetics and occlusion. The screw-retained framework was secured to the implants at 35 Ncm torque. The screw access holes were sealed with gutta-percha and composite resin. The processed denture with attachments on the intaglio surface was tried on the titanium framework (Figure 6) and occlusal adjustments were done to achieve mutually protected occlusion. The implant prosthesis restored lost function and provided the necessary esthetics (figure 7). The importance of maintaining hygiene was reinforced and follow-up checkups were done and necessary occlusal adjustments were done in follow-up appointments. Patient was emphasized on need of regular follow-ups.



**Figure 1:**Endosseous implants placed in the maxillary arch



**Figure 2:** Implants with healing abutments



**Figure 3:** Transfer impression



**Figure 4:** CAD CAM milled Titanium Framework with ball attachment



**Figure 5:** Verification of passive fit of framework



**Figure 6:** Fabrication of denture with attachment



**Figure 7:** Final Prosthesis without palatal coverage

### **III. Discussion:**

Meeting patient's high esthetic demands through a maxillary full-arch implant-supported rehabilitation depends on the achievement of several biological and mechanical goals.[6,7. Restorative prosthesis for completely edentulous patients is usually done by cement retained and screw retained hybrid prosthesis. The major advantages of Screw- retained implant fixed prostheses are ease of retrievability, benefit of splinting, and low profile retention. But lack of passive fit of the cast framework and distortion of the framework upon porcelain firing can affect the biomechanics of the prosthesis. This case report presents with the use of Cad cam milled titanium framework which will play a significant role in controlling the stress and also the less specific gravity adds onto the advantage.

The implant supported milled bar overdenture is a therapeutic option requiring its correct diagnosis and adequate therapeutic planning from start. When it is well planned, it offers excellent long run rates of success in the upper maxilla and mandible. Clinic cases originally designed for fixed prosthetic implant restoration and later reconstructed with overdentures present higher failure rates, especially in the upper maxilla. In such cases, the overdenture is a rescue or an emergency treatment (8-10). Limiting factors such as lower bone quality (type 3 or 4, according to Lekholm and Zarb's classification), pumping up of maxilla sinuses, presence of the nasal fossae, the centripetal alveolar reabsorption, etc., are frequent in upper maxilla cases where there is a severe to moderate bone wearing off. All of these factors are related to a higher failure rate of the upper maxilla overdenture over the mandible overdenture (12,9,20).

Compared to the implant mucous supported overdenture, the implant supported milled bar overdenture presents neither a mucous rest or movement, limiting bone reabsorption of the crowns and extending the life of their attachments (due to their lesser use), decreasing prosthetic complications and maintenance needs (8-10). The minimum number of implants needed in milled bar overdentures, their placement and characteristics, are concepts still to be decided on in the international literature. They should be established for each individual case, taking into account that the mechanism of these prostheses is similar to that of fixed prostheses and that, if implants are only placed in the anterior area, distal cantilevers will be necessary to provide an adequate rear support (1,7,12). The suprastructure is recommended to be precisely and rigidly adjusted to the milled bar and made of the same alloy. Otherwise, the wearing away of the area between the suprastructure and the milled bar can be accelerated, and the presence of different metals give rise to galvanism phenomena (4). Clinical and laboratory processes involved in the making of the implant supported milled bar overdenture are similar to those needed to make the hybrid fixed removable overdenture, as originally designed by Dr. Branemark (13,14). Depending on the design of the prosthesis, the type, number and location of the attachments can vary. These attachments should fulfil the following characteristics: offer retention capacity, be cheap, need low maintenance cost, have the right dimensions, be easy to be replaced and allow an easy insertion and removal of the prosthesis (1-3, 8-10,14).

In moderate to severe reabsorbed edentulous ridge cases, the implant-supported milled bar overdenture is a therapeutic option which offers many advantages over the metal porcelain fixed or the hybrid fixed-detachable prostheses. Implant-supported milled bar overdentures present a similar stability and retention to that of the fixed prosthesis, with the advantages of the removable ones. The labial flanges can be extended as needed, making hygiene care easier and providing the right lip support. They can also be extended in clinical edentulous ridge cases which are visible when laughing, avoiding the transitional area between the gingival acrylic resin and the patient's mucous from being shown. The emerging of screws fixing the bar to implants in its vestibular side does not affect the aesthetics of the overdenture (as it happens with screwed prostheses) and the wrong position of some of the implants is not such a serious problem. Besides, the prosthesis can be removed at night to solve bruxism problems (1,2,4,7,9,16). Implant supported milled bar overdentures make it easier to replace the lack of tissues and to provide hygiene care in patients who have suffered the surgical ablation of maxillary tumours or present genetic problems causing lack of one or several teeth or the underdevelopment of dental crowns. Their high level of retention and stability improve patients' comfort, and

their scarce mucous rest avoid trauma of soft tissues, avoiding possible future problems of osteoradionecrosis in irradiated patients (17,18).

#### **IV. Conclusion :**

In current day practice since there is paradigm shift towards the implant supported prosthesis and they play a pivotal role in rehabilitation of completely edentulous patients. The CAD CAM milled titanium implant supported milled bar overdenture is a very interesting treatment option for patients with moderate to severe resorbed maxilla problems. They offer the advantages of removable prostheses with the stability and retention of fixed prostheses.

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