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**Sonia Madaan Nanda**  
BDS, MDS, Demonstrator,  
Department of Prosthodontics  
and Crown & Bridge, Post  
Graduate Institute of Dental  
Sciences, Rohtak.

**Tarun Nanda**  
BDS, MDS, Demonstrator,  
Department of Periodontics,  
Post Graduate Institute of  
Dental Sciences, Rohtak.

**Neha Sikka**  
BDS, MDS, Demonstrator,  
Department of Prosthodontics  
and Crown & Bridge, Post  
Graduate Institute of Dental  
Sciences, Rohtak.

**Kusum Yadav**  
BDS, MDS, Demonstrator,  
Department of Prosthodontics  
and Crown & Bridge, Post  
Graduate Institute of Dental  
Sciences, Rohtak.

**Correspondence**  
**Neha Sikka**  
BDS, MDS, Demonstrator,  
Department of Prosthodontics  
and Crown & Bridge, Post  
Graduate Institute of Dental  
Sciences, Rohtak.

## Maxillary anterior teeth replacement with implant supported prosthesis- A case report

**Sonia Madaan Nanda, Tarun Nanda, Neha Sikka, Kusum Yadav.**

### Abstract

Dental implants are an appropriate treatment option for replacing missing maxillary teeth in adolescents when their dental and skeletal development is complete. This case report presents the treatment of a patient with missing maxillary anteriors using dental implants with angled abutments.

**Keywords:** Dental abutment, Dental implants, Emergence profile, Maxilla.

### 1. Introduction

Tooth loss in the anterior region is commonly the result of a traumatic injury or a congenital anomaly. Several options are available for the replacement of missing teeth [1-4]. These include removable dental prostheses, conventional fixed partial dentures (FPDs), resin-bonded FPDs, implant supported prostheses [1, 4, 5]. The traditional treatment for an edentulous space in maxillary anterior region is a conventional FPD. A major shortcoming of these alternatives is the significant tooth reduction of the abutments. Sub-gingival margins are required in esthetic situations, but these are associated with increased gingival inflammation [6]. Implant supported FPD is an appropriate treatment option for replacing missing maxillary anterior teeth in adolescents when their dental and skeletal development is complete [7-9]. For males, completion of facial growth, which of-ten corresponds to general growth, may not occur until the age of 21 years; in young women, growth may be completed by age 15 [3, 9]. If growth is complete, dental implants can be placed as soon as the edentulous space has been created. In the anterior maxilla, the placement of an implant in a prosthetically ideal position is often not possible because of the lack of sufficient bone, vertically or horizontally. Because of esthetic or spatial needs, angled abutments are often needed after placement of dental implants in the esthetic zone. The preservation of soft tissues and regeneration of inter-dental papillae are critical for the esthetic success. This case report presents the multiple-teeth implant treatment of a patient with congenitally missing maxillary anteriors using angled abutments.

### 2 Case-Study

A 23 yr old female patient who has worn a maxillary RPD for 2 years reported with several complaints and concerns. She presented with lost left sided central incisor, lateral incisor and canine due to trauma and requested a treatment plan which would resolve her problems concerning the ill-fit and poor function of the RPD. Pre-operative models and radiographs were taken. Although some bone loss was noted intra-orally (bone sounding was carried out) and radio graphically, it was determined that no bone grafting was required in order to restore function. The models were sent for a diagnostic wax up in order to have the surgeon and restorative dentist ensure proper placement of the implants for a successful result.

**2.1. Treatment Planning-**Treatment planning in edentulous posterior areas requires the patient and doctor to consider many factors in determining the ideal treatment route. Implant retained restorations provide considerable advantages over removable partial dentures. Improved support, preservation of bone and simplification of the prosthesis are a few reasons why implants are the treatment of choice for missing posterior teeth [1]. It is often more Conservative as the adjacent teeth can be spared unnecessary preparation and loading.

The treatment plan should take into consideration the height and width of bone as well as the type of bone. The level of horizontal gingiva compared to the adjacent teeth and the length of time that the area has been edentulous. The major anatomical limitations regarding vessels and nerves must be identified or taken into consideration. The bone in this area has been found to be excellent quality in most patients. One must also assess the opposing dentition for movement or extrusion which can result in limited interocclusal space for the restoration. The number of implants needed in each area must also be considered. Our choice is usually three separate implants or a 3-unit FPD on two solid abutments. The number of implants is dependant on bone quantity and quality [1]. Bone quality in this case was excellent and with patient and dentist communication the treatment plan was to place two implants in edentulous area replacing a total of three teeth with one implant retained 3-unit FPD's.

Cemented restorations are preferred as it has the benefit of a more esthetic result as occlusal screw holes can be avoided. It is nice to avoid these openings in the smaller more anterior teeth but are often used more posterior. The disadvantages of the cemented restorations involve irretrievability which facilitates individual implant evaluation, soft tissue inspection and modifications. The author also prefers the ease of use of the solid abutments and the ability to proceed through treatment with the most similarities to traditional fabrication of a 3-unit FPD including final preparation, impression and lab communication. The author acknowledges that as well as retrievability, the screw retained restorations have the advantages of being able to evaluate implant loading, occlusion, tissue response and screw loosening prior to permanent cementation [2]. The author will sometimes choose to cement the final prosthesis with a temporary cement to make retrieval slightly easier if necessary.

### 3. Treatment

**3.1. Presurgical-**The surgery planned for this patient involved bilateral local anesthesia and placement of two implants in edentulous areas. (Fig 1 & 2) Implants sited were determined by the surgeon using the diagnostic wax-up as a guide with the middle of the implant to line up with the inner incline of the maxillary palatal cusps.



Fig 1



Fig 2

**3.2. Surgical placement-** Optimal implant placement is critical to the esthetic and functional success of implant-supported restorations [3]. The implants were placed with the hand wrench and the surgeon was able to ensure excellent primary stability (Fig. 3, 4).



Fig 3



Fig 4

**3.3. Post surgery/healing-**Immediate denture was fabricated and delivered (Fig-5). Post-surgical instructions included having a soft diet for 48 hours and scrupulous oral hygiene and cleansing of the partial denture. The patient was scheduled to return in 6-8 weeks for abutment placement and final restorative impressions. When the patient returned in eight weeks for a final impression the implants were evaluated for adequate osseointegration. The patient had no signs of post-operative infection and had no complications in the healing phase. The doctor ensured there was no mobility in the implants and the cover screws were removed. Although little is known on the etiopathogenesis of early failures in achieving osseointegration, they should be viewed as a lack of osteogenic response in relation to endogenous factors (impaired healing) and exogenous factors (excessive trauma, infection, premature loading) [8]. Once the healing caps were removed we chose the solid abutments to be used. Then we torqued into place 4mm solid abutments using the torque wrench to place them with 35N of force. The position and angulations of the abutments was ideal. The final impression was taken. A bite registration was taken (Regisil, Dentsply/Caulk, Milford, DE) and appropriate shade matching was noted. All of the information gathered (impression, bite, lab prescription) was sent to the laboratory along with implant analogs (Fig. 6) to be used in the final stone model for fabrication of the final restoration. Impression was taken with polyvinyl siloxane material (Reprosil, Dentsply/Caulk, Milford, DE). The implants were covered with temporary buttons supplied by Straumann which were fitted into place and cemented with tempbond. These prevented gingival overgrowth while the final prostheses were fabricated. Metal try in was done. (Fig 7)



Fig 5



Fig 6



Fig 7

**3.4. Insertion-**Once the final restorations were returned from the lab they were visually inspected on the models for fit and esthetics. Intra-orally the temporaries were removed and the implants and abutments were cleaned of cement and rinsed with air and water. The FPD's were tried in to ensure a passive fit (Fig 8). Until now there is no precise method for determining the accuracy of fit of an implant superstructure in a quantifiable way [9] however, the author will ensure the restoration completely seats with very mild operator pressure. In the author's experience as well it is noted that 'the precision of fit which can be obtained through common laboratory and clinical procedures of superstructure fabrication seems to be sufficient enough to produce restorations that do not cause bone damage [9] nor do they result in implant failure due to undue loading forces. Once the fit was established the occlusion was checked to ensure very light occlusion with no excursive interferences present.(Fig 9) The restorations needed very minor adjustment and were polished and cemented with a resin cement (RelyX, 3M ESPE, St. Paul, MN). Once the cement was set and excess cleaned the occlusion was doubled checked and a final polish was carried out. The anatomy and facial profile of the restorations follow the natural teeth very nicely.



Fig 8



**Fig 9**

A final periapical radiograph was taken on each side to ensure complete seating of the restoration and complete removal of hardened cement

**3.5. Follow-Up-**A radiograph and follow-up exam at eight weeks healing shows an excellent result. The author is confident they possess a wonderful prognosis for long term success. The doctor will monitor the restorations and implants periodically with oral exams and radiographs and the patient will be instructed on the importance of continuing excellent home care consisting of regular brushing and flossing. Patient experience no sensitivity or discomfort with the restorations or implants and report to be extremely happy with the function and esthetics of the implant supported FPD's.

#### **4. Conclusion**

As the case study illustrate, the implant supported FPD is a wonderful treatment option to restore posterior missing teeth with or without the presence of a partial denture. The author strongly urges doctors and patients to consider this a primary treatment option for replacing these missing teeth. As well as the considerable functional and esthetic improvements the prosthesis will also improve patient self-confidence and overall health. The patient expressed gratitude to the author stating, "I got to go snorkeling for the first time ever after having the implants replace the denture." The result also leaves the patient and doctor with very few ongoing problems and much easier maintenance.

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