



“THE PROSTHODONTIC TREATMENT OF UNFAVOURABLE POSITIONED IMPLANT IN ANTERIOR MAXILLA”- A CASE REPORT.

Prosthodontics

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ABSTRACT

With the advancement in the dental implant treatment, many new innovative improvements have been developed in the designs and components of implants. These improvements help to handle the compromising situations where sometimes the good treatment option can become more challenging. One of the such grueling condition is implant placement in the anterior maxilla where dentist has to fulfill both aesthetic and functional demand. Many aesthetic failures of implant have been reported in the literature in the anterior maxilla. One of them is placing implant in sites with deficiency of facial bone thickness which sometimes resulted in malposition of implant. This case report discusses about the prosthodontic correction of malpositioned implant in the anterior maxilla by using castable abutment. The use of castable abutment is concluded as successful treatment option for complex misaligned and malposed single dental implant.

KEYWORDS

malpositioned implant, castable abutment, UCLA abutment.

INTRODUCTION

Today dental implant have become one of the viable treatment option for restoration of missing teeth. Various studies have been published which discussed about the criteria of their success and failure. The success of implant surgery depends upon providing long lasting anchorage in best possible position for a functionally and aesthetically optimal restoration. But still various aesthetic failure occur during placement of implant in the anterior maxilla.

The placement of implant in the anterior maxilla poses many challenges like the alveolar ridge dimensions, the implant location, position of lip, the architecture of the free gingival margin, labial plate resorption and high aesthetic demand.^{1,2,3} One of the most common and preventable challenge is an error in implant placement in unfavourable facial position.

The reason behind malplacement are poor case selection; poor treatment planning; poor communication between the patient, surgeon, restorative dentist and laboratory personnel. The proper treatment planning and the careful execution of implant placement are mandatory steps to achieve the success in implant. If these principles are not followed, the results might be disappointing and compromised.^{4,5,6}

When the implant placement is not in optimal position then only two options left either surgical removal of implant or prosthodontic management.^{7,8} Various restorative options have been used to correct major axis-related problems and spatial discrepancies like angled angulated abutments, castable abutments, or in severe cases, removable prostheses. The case report presented here describes the management of deep labially placed single implant in an anterior maxilla.

CASE REPORT

A 24 year old male patient reported to the institute of dental studies and technologies of Prosthodontics, Modinagar, U.P, India with a chief complaint of missing teeth. Patient history and clinical examination revealed missing maxillary right central incisor which he had lost five years back due to trauma. The patient was informed about every possible treatment option and he had decided to go for fixed dental implant prosthesis. The patient had revealed no relevant medical history and routine investigations had been performed and results were within normal limits. Following this two stage surgery for implant was performed in oral surgery department. After a six month period of healing second stage surgery was done, the cover screw was removed and healing abutment (gingival conformer) was placed. The case was then referred to the Department of Prosthodontics for prosthesis fabrication. During treatment planning for restorative options, optimal implant position was observed in three geometric planes-faciopalatal

angulation, depth and positioning. It was noticed that implant was deep labially malaligned (Figure 1). The proper observation was done and decided that following treatment option should be given to the patient like surgical removal of implant followed by grafting and a second implant placement, re-submerging of osseointegrated implant followed by a fixed dental prosthesis, relocation of the malpositioned implant by segmental osteotomies, prosthodontic management by 25 degree angulated implant abutment or fabricating customized implant abutment. The patient did not agree for any kind of surgical procedures. He had selected prosthodontic management in which crown was placed by fabricating customized implant abutment

The advantages of customized implant abutment are

- They help to achieve passive fit
- The final restorations are obtained according to the patient exact gingival architecture, achieving an optimal emergence profile and a more esthetically pleasing outcome.
- It also helps to correct the angulation of the implants

The use of customized abutment was also became a challenge due to severe angulation. The patient was recalled on next appointment and treatment was started by using chlorhexidine mouth wash. The healing abutment was removed and open tray impression coping was placed to make an impression. An abutment analogue was tightened to the impression coping ensuring immobility of the impression coping during this process. The impression was made with addition silicone elastomeric impression material (Aquasil; Dentsply). The implant analog was placed in the impression and silicone resin was injected around the analog to mimic gingival tissue. The impression was poured with Type III dental stone, and the models were made. The tray was removed after it gets set completely and checked for all required details. A castable abutment (plastic abutment, DENTIS implant system, KOREA) was used in this case to correct the severe buccal mal-alignment of implant. When the angulation was corrected, the castable abutment casting was performed. After casting final adjustment was performed by milling machine. The angulation in this case was so severe that it was impossible to use a castable abutment as screw retained because the screw hole would be at labial side which was unaesthetic. To overcome this defect pink porcelain was used in cervical collar. The plastic sleeve was attached to the implant analog. The angulation of the sleeve was adjusted by trimming and molding. Inlay casting wax was added incrementally to obtain a framework, similar to a central incisor. The carving was completed. It was immediately invested and standard casting procedure was followed. Shade matching along with ceramic build-up completed. The abutment screw access was left intact (Figure 2). Trial seating of the crown was done for verification of esthetics, fit and interferences. On confirmation, glazing was done. Postglazing, the abutment screw access was closed with visible light cure (VLC) composite resin. The

post insertion instructions were given to the patient for the maintenance of the crown (Figure 3).

DISCUSSION

Nowadays the most popular and reliable treatment option to restore missing teeth is implant restoration. Previously the success of dental implant depends upon osseointegration. Ideally, the implant should not be considered successful until the patient is completely satisfied with both the functional and esthetic results. The success of implant depends upon proper case selection, meticulous planning, good imaging techniques, and a good communication between the surgeon, restorative doctor, and the laboratory personnel. In this case the implant was severely malpositioned in the anterior maxillary region.⁹ The treatment plan selected was castable abutment to correct the angulation.

Although, the number of treatment options available to treat mild to moderate malpositioned implant. Some of them are prefabricated angulated abutments, customized abutments and UCLA type abutments. In 2008, Kao et al.¹⁰ observed that angled abutment up to 25 degrees can increase the stress in the peri-implant bone by 18%. However, Saab et al.¹¹ measured and compared the bone tension distribution around an implant in the anterior maxilla using 2 different abutments, parallel and angulated, by means of finite element analysis. The results showed that most of the tension produced on the cancellous and cortical bone was within the range that has been reported to increase bone mass and mineralization.

Another treatment option for severely malpositioned includes sub-apical osteotomy to segmental osteotomy. But the segmental osteotomy can be used only in case of well osseointegrated implant with well formed surrounding bone. This segment is contraindicated if the segment has to be mobilized more than 8mm to correct the malposition.^{12,13}

The removal of implant leads to the reconstruction of implant site with block graft, advanced regenerative procedure or submergence of the mal-aligned implant. These surgical procedure sometimes results in loss of hard and soft tissue in the esthetic zone.^{14,15}

However, the patient was totally reluctant to undergo a second surgical procedure in this case, it would become more important to explore other reliable treatment option. Therefore, by considering the patient concern, the castable abutment was used as feasible treatment option. It helps to correct the correct the angulation and also to get the exact gingival architecture. This custom abutment was fabricated by using plastic sleeve which allowed to develop a wax up in the desired abutment form. Firstly by plastic removal during a wax up procedure and secondly after casting final adjustment was performed by milling machine¹⁶. The fit was accurate in custom cast abutment. The abutment screw access was in buccal side and also visible when the patient smiled. The abutment screw access was closed with VLC composite resin. The patient was quite satisfied after the treatment.

CONCLUSION

The main factor that caused this failure was probably inappropriate case selection for immediate implant placement as defect in buccal bone. The different possible treatment options were discussed briefly and the possible prosthetic decision presented. In this case report castable abutment was used to correct the malpositioning of the implant.



Figure 1.

Figure 2.

Figure 3.

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