



IMPLANT PLACEMENT IN ESTHETIC ZONE: A REAL CHALLENGING TASK

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Abstract- Implant placement and restoration to replace single or multiple teeth in the esthetic zone is an especially challenging area for the clinician, particularly in sites with deficiencies in soft tissue or bone. Preservation or creation of a soft tissue scaffold needed to create the illusion of a natural tooth is often challenging and difficult to achieve. Placement of a dental implant in the esthetic zone is a technique sensitive procedure. More recently a trend towards single stage and immediate extraction implants have emerged, appearing especially attractive in anterior region, where soft tissue drape is present before the tooth extraction and the patients are more anxious to get a fixed replacement.

Keywords- Implants, esthetic zone, Single stage, Implant supported Prosthesis, Attached Gingiva, Bone Loss

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Introduction

The ideal goal of modern dentistry is to restore the patient to normal contour, function, comfort, esthetics, speech, and health. What makes implant dentistry unique is the ability to achieve this ideal goal regardless of the atrophy, disease, or injury of the stomatognathic system.[1] The increased need and use of implant-related treatments resulted from the combined effect of a number of factors such as an aging population living longer, tooth loss related to age, consequences of fixed prosthesis failure, anatomical consequences of edentulism, poor performance of removable prosthesis, consequences of removable partial dentures, psychological aspects of tooth loss and needs of aging baby boomers, predictable long-term results of implant-supported prostheses and the advantages of implant-supported prosthesis

In the early years of modern implantology, the chief concern was tissue health and implant survival. But over the last decade, there has been an increasing realization that esthetics is just as important to the success of the final restoration as is health. Patients increasingly demand restorations that are as esthetic as they are functional.

Implant placement and restoration to replace single or multiple teeth in the esthetic zone has been a challenge to the clinician. It has been a technique sensitive procedure with little room for error. Preservation or creation of a soft tissue scaffold, to create the illusion of a natural tooth, is challenging and difficult to achieve.

Implant placement and restoration to replace single or multiple teeth in the esthetic zone is an especially challenging area for the clinician, particularly in sites with deficiencies in soft tissue or bone. Dental implant placement in the esthetic zone is a technique sensitive procedure.

A smaller mistake in the positioning of the implant or the mishandling of soft or hard tissue has led to esthetic failure and patient dissatisfaction. The implant should be considered as the apical extension of the restoration and the preferred

design of the restoration should guide the surgical placement of the implant. This concept is known as restoration driven implant placement, in contrast to the previously accepted concept of bone-driven implant placement. Restoration-driven implant placement mandates that the implant is placed where it can be properly restored. If the desired site is lacking in bone or soft tissue, then augmentation procedures must be used to create an acceptable site. Optimal esthetic implant restoration depends on proper three-dimensional implant positioning. Four positional parameters contribute to the success of the restoration and all must be carefully considered during implant placement. These parameters [2] are Bucco-lingual positioning, Mesio-distal positioning, Apico-coronal positions relative to the implant platform and angulation of the implant. In addition to these the interdental papillae should also be evaluated. Contrary to missing a posterior tooth, most patients have an emotional response regarding an anterior missing tooth. From the patient perspective anterior FPD restoration has never been as esthetic as a natural tooth. Because these patients are only able to notice the restorations that are not natural in appearance, they think anterior FPD are not esthetic as restoration driven implant. Anterior tooth replacement is one of the most challenging restorations in dentistry, however in the light of all advantages of single implant longevity, bone maintenance, reduced abutment teeth complications, and increased adjacent teeth survival, single implants have now become the treatment of choice.

Single tooth implants have the highest success rates compared with any other treatment options to replace missing teeth with an implant restoration such as over dentures, short span FPD, full arch FPD. More recently a trend towards single stage and immediate extraction implants has emerged as compared to the past, appearing especially attractive in anterior region, where soft tissue drape is present before the tooth extraction and the patients are more anxious to get a fixed replacement.

The advantages of Non- Functional immediate teeth are that patient has a fixed

esthetic tooth replacement soon after first stage surgery. No stage 2 surgery is necessary which eliminates the discomfort for the patient and decreases overhead for the dentist. Countersinking the implant below the crestal bone is eliminated, which reduces early crestal bone loss. The soft tissue emergence may be developed with the transitional prosthesis and the tissue allowed to mature during the bone healing process. The soft tissue hemidesmosomal attachment on the implant body below the micro-gap connection may heal with improved interface. Where as its disadvantages has been that micro-movement of implant that can cause crestal bone loss or implant failure is greater than with stage 2 surgery. The dentist is less likely to reflect the tissue at stage 2 surgery and can evaluate implant crestal bone directly. Para-function from tongue or foreign habits (pen biting) may cause trauma and crestal bone loss or implant failure. Bone that is too soft, small implant diameters, or implant designs with less surface area may cause too crestal stress contours and cause bone loss or implant failure.

Case Report

A 18 year old, female patient reported to the Department of Periodontology UPRIMS & R, Saifai with the chief complain of missing lower anterior teeth and patient desired for replacement of same. The patient had congenital missing permanent central incisors. There was a deciduous incisor present, which was mobile [Fig-1]. The patient was healthy, her medical history was non-contributory and there was no past dental history. On Extra-oral examination, there was adequate mouth opening with no sign & symptom of TMJ dysfunction. The path and range of mandibular movements were normal. Smiling lip line was also normal. Intra-oral examination revealed Class I molar relation with bilateral canine guided occlusion. 31, 41 teeth were missing. Examination of implant site revealed normal healthy gingiva and adequate band of attached gingiva. Adjacent teeth were vital, normal in colour & appearance, free of any pathological mobility. No pockets were present. On radiographic examination, OPG used for primary screening revealed no pathology in the jaw and IOPA X-rays of implant sites revealed normal trabecular pattern. [Fig-2,3].



Fig-1 Pre-operative intra-oral



Fig-2 pre-operative OPG

To restore the missing incisors, the following prosthetic treatment options were explained to the patient along with their pros & cons.

1. Implant supported prosthesis

2. RPD
3. Conventional FPD

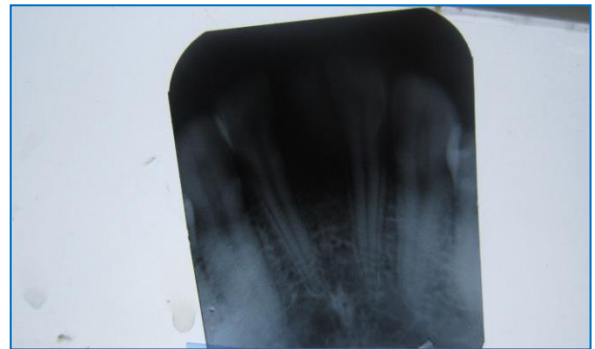


Fig-3 Pre-operative IOPA

Patient opted for implant supported fixed prosthesis. Available vertical bone height >20 mm (from OPG) Hence implant length of 13 mm was selected. Available mesiodistal space was:

- As per IOPA = 6.5 mm
- As per cast = 5.5 mm [Fig-4]
- As per OPG = 7 mm



Fig-4 Fabrication of Cast

The space was sufficient enough for 2.4 mm implant. As determined by ridge mapping the abutments were planned to emerge from the incisal edges of the proposed crowns and surgical guide [Fig-5] was fabricated along that proposed angulations in clear acrylic. So based on evaluation of clinical & radiological data implants of following dimensions were selected for the case with a length of 13 mm and diameter of 2.4 mm [Fig-6,7]. The patient was prescribed Amoxycillin 1 gm 1 hr. before surgery and then 500 mg 3 times daily for next 3 days. A papillae sparing incision (parapapillary incision) was given to preserve the blood supply to the delicate inter-dental papillae and to minimize the potential of postsurgical gingival recession.

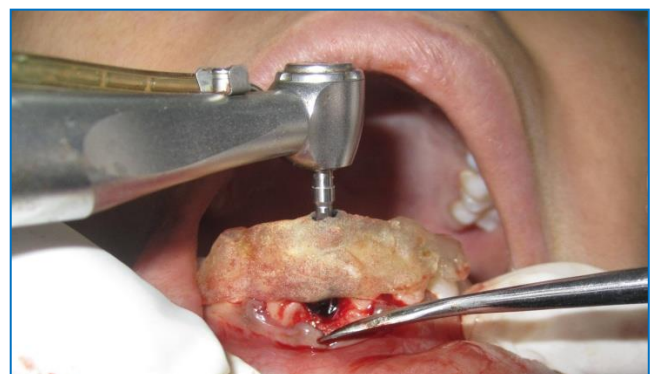


Fig-5 Placement of marking

The Osteotomy sequence comprised of Pilot drill followed by implant insertion. The raised flap was approximated with 4.0 or 5.0 black silk suture and patient was recalled after one week for suture removal and after 3 months following implant placement [Fig-8,9].

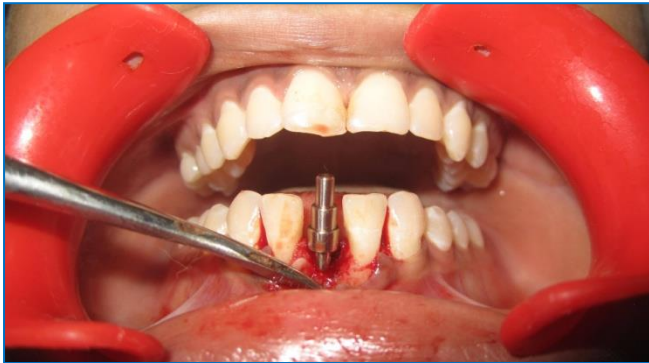


Fig-6 Paralleling tool



Fig-7 Implant placed



Fig-8 Provisional Restoration



Fig-9 Suture placed

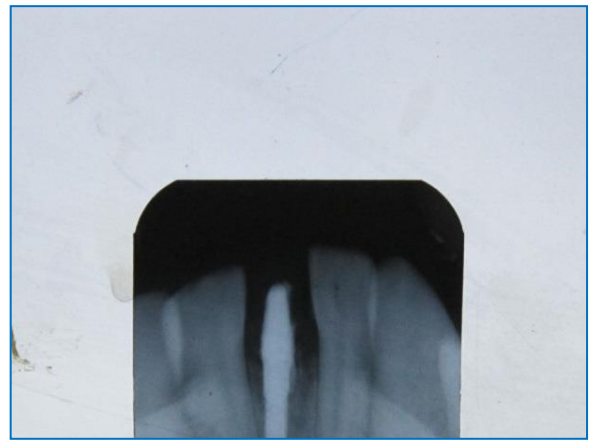


Fig-10 Post-operative IOPA



Fig-11 3 Month post-operative

Discussion

Extraction sites in the anterior maxilla can present restorative challenges with regard to esthetics. Resistance to wearing a temporary removable partial denture during healing makes immediate implant therapy an appealing alternative to the patients. Now a days recently flapless implant placement is becoming more popular. Flapless implant placement helps to preserve the site morphology by protecting and supporting existing hard and soft tissues while minimizing surgical trauma to the adjacent tissues. Using a previously fabricated index, a provisional acrylic crown was fabricated and delivered to the patient on the day of implant placement. It represents a viable treatment option in appropriate clinical situations where esthetics is of high priority. Immediate post extraction implant placement based on proper examination and diagnosis would reduce patient burden. [3] Several long-term studies on single tooth replacement have shown excellent results over a 5 year period. [4] To achieve successful bone to implant contact (osseointegration), oral implants placed according to a 2 stage surgical protocols have been advocated to remain unloaded for a healing period of 3-6 months. A reanalysis of this original experimental design has questioned the necessity for a long implant healing period. The current scientific literature supports the concepts that the implants can be loaded early or immediately.

Studies regarding different types of prosthesis have shown that early loading of mandibular implants can provide treatment outcomes comparable to those achieved using standard healing periods before loading. [5] Early publications on immediate restoration of a single unsplinted implants in the esthetic zones were presented as case reports and series. Kupeyan and May reported on series of 10 and 14 immediately restored implants, respectively in the maxillary anterior region. In their study, all implants clinically integrated and remained stable for the observation periods of 6 months to 3 years. [6] Correct clinical, prosthetic and surgical management of endosseous implant replacing missing teeth in anterior regions has helped the dental surgeon to achieve predictable esthetic outcomes. Immediate provisionalization of dental implants enables the patients to avoid the physical discomfort of wearing a removable interim prosthesis or the psychological trauma of a compromised smile. [7] There has been a risk of mucosal recession and adverse soft tissue esthetic with immediate implant placement. However, this

risk may be reduced by avoiding buccal placement of implant in extraction sockets. The biotype of the gingiva usually is called thick or thin, thicker tissue is more resistant to the shrinkage or recession and more often leads to the formation of a periodontal pocket after bone loss. Thin gingival tissues around the teeth are more prone to shrinkage after tooth extraction and more difficult to elevate or augment after tooth loss. Gingival recession is the most common esthetic complication after anterior single-tooth extraction and is also a concern after implant surgery and uncovering. Several techniques have been described to minimize soft tissue recession and allow optimal papilla healing. [8-12]. If the mesial and distal papillae are in the ideal position, they should be left intact, and a papilla-saving incision should be made with facial vertical release incisions joining a crestal incision. If the papillae are depressed already, the crestal incision is made to the palatal aspect of the adjacent teeth and a sulcular incision is carried on the proximal aspect of the adjacent teeth, and the papillae are reflected as part of the mucoperiosteal facial flap. The two most common complications of anterior single tooth implant replacement are abutment screw loosening and crestal bone loss.

Conclusion

The replacement of a single tooth in the pre-maxilla is most challenging because of highly specific soft and hard tissue criteria in addition to all other esthetic, phonetic, functional, and occlusal requirements. Anterior tooth loss usually compromises ideal bone volume and position for proper implant placement. Implant diameter, compared with that of natural teeth, results in challenging cervical esthetics. Unique surgical and prosthetic concepts are implemented for proper results. In spite of all the technical difficulties, the anterior single-tooth implant is the modality of choice to replace a missing anterior maxillary tooth.

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