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Case Report

EVALUATION OF CLINICAL AND RADIOGRAPHIC EFFICACY OF ONE PIECE IMPLANT WITH IMMEDIATE NON-OCCLUSAL PROVISIONALIZATION IN HEALED MAXILLARY ESTHETIC ZONE - A CASE REPORT

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ABSTRACT

The use of dental implants to replace the natural tooth system has become common place in the contemporary dental practice. However, the advent of smaller diameter implants and their documented use in the literature over the past 15 years lends to their acceptable placement for treatments ranging from immediate stabilization of bone augmented ridges to tooth replacement in the esthetic zone. The one-piece implant design provides an attractive and easy alternative to two-piece implants for replacement of missing tooth with immediate provisional restoration. This article presents two case reports to demonstrate the minimally invasive surgical placement of one piece implants and to evaluate the clinical and radiographic efficacy of one piece implant with immediate non-occlusal provisionalization in healed maxillary esthetic zone.

Keywords: Dental Implants, Conventional Loading, Immediate Non-Occlusal Loading.

INTRODUCTION

Esthetic demands are increasing in oral and maxillofacial surgery and patient's expectations are growing higher every day. In no place is it more difficult to meet these expectations than in the dental esthetic zone¹.

Loss of tooth not only causes disharmony in the dynamic occlusal equilibrium but is also intriguing to the dentist and psychologically disturbing to the patient as it compromises esthetic, functional and masticatory component of the occlusion. For these reasons, developing artificial replacement for missing teeth has been an elusive goal for many years².

An implant that is osseointegrated does not always translate into esthetic success. In the anterior zone, the success of single-implant therapy is not only determined by high survival rates, but even more by the (long-term) quality of survival, dictated by a mixture of several factors. Preferably, the appearance of the peri-implant soft tissue should be in harmony with the mucosa around the adjacent teeth and the implant crown should be in balance with the neighboring dentition^{3,4}.

The original Branemark concept of osseointegration advocated a 2-stage surgical procedure. Following placement, the implant was covered by the mucosa and the site was left to heal. A few months later, a second surgical intervention took

place involving the placement of an abutment, which penetrated the soft tissue^{5,6}. Today, implants are often placed in a one stage procedure and provided with a prosthetic restoration immediately after implant placement, with high success rates.

A one-piece design, which incorporates the transmucosal abutment as an integral part of the implant, eliminates the structural weakness built into a 2-piece implant system. Thus, the 1 -piece implant can, if it has sufficient mechanical strength, be made with a smaller diameter, accommodating areas with limited bone volume and or inter-dental space. Moreover, with a 1-piece implant design, manipulation of the peri-implant soft tissue after initial healing can be avoided. The implant can be provided with a provisional restoration at placement, allowing for the mucosal epithelium and the connective tissue adhesion to form coronal to the alveolar crest. Moreover, one stage approach saves the patients and clinicians time and money; therefore, immediate temporization is becoming state of art procedures for implant clinician⁷.

In the present case report, one-piece immediate loading implant system with the built on abutment has been used. Both cases were managed by a minimally invasive surgical placement approach through flapless and immediate non-occlusal provisionalization procedure to aid in the sculpting of

the soft tissue emergence profile, which is necessary for the final esthetic restoration.

The following case report aimed “to evaluate clinical and radiographic efficacy of one piece implant with immediate non-occlusal provisionalization in healed maxillary esthetic zone”.

CASE REPORT 1

A 28-year-old male patient with missing right maxillary canine, visited for prosthetic replacement of maxillary right lateral canine which was extracted 6 months back (Fig.1).



Figure 1: Missing Right Maxillary Canine

There was no significant past or present adverse medical history and oral hygiene was acceptable. A thorough clinical examination, laboratory investigation, radiological examination and assessment of study model was performed. Patient was administered 1gm of amoxicillin 1 hour prior to surgery and instructed to rinse with 0.2% chlorhexidine gluconate for 1 minute prior to surgical procedure.

Surgical Technique:

The intra-arch relationship was evaluated clinically and by using of diagnostic casts. Intra oral peri-apical radiographs and OPG were taken to assess bone architecture, surrounding structures and to decide the dimension of implant to be placed (Fig 2)^{12,13}.



Figure 2: Pre Operative IOPA

An individualized acrylic resin occlusal template was fabricated for each patient to obtain an ideal position for implant placement¹⁴.

Under local anesthesia (2% lignocaine Hcl with 1:80,000 adrenaline) the the bone was exposed through flapless method using disposable punch biopsy instrument (Fig 3).



Figure 3: Exposure of bone through flapless approach & implant bed preparation with Surgical Drills

The implant bed preparation was done with standard drills using the surgical template as guide with the help of physiodispenser with a drill speed of 1000rpm.

Implant used was one piece with abutment, non-submerged, tapered at apical 5 mm, sandblasted and acid-etched surfaced with dimension of 2.8 X 10mm⁶. The implants were placed in the recipient site by means of an insertion device, and a torque driver set at 35Ncm which was used to evaluate primary stability of implant. The implant neck was positioned at the crystal bone level (Fig 4).



Figure 4: Post placement of one piece implant

Intraoral periapical radiograph was taken immediately after surgery. Temporary acrylic shell crown was placed using clear acrylic which was cemented with temporary cement and the restoration was cleared from all contact in centric occlusion and during eccentric movements (Fig 5).



Figure 5: Immediate Non-Occlusal Provisionalization

Following provisionalization, post-operative instructions were given to avoid manipulation of the surgical site. Patients were instructed to follow a soft diet and to avoid exerting force on the temporary restoration^{3,8,15}. Post operatively antibiotics (Cap. Amoxicillin 500mg tid for 5days)¹⁶. Analgesic medication (Tab. Diclofenac sodium tid for 3days) were prescribed for all patients^{17,18,19}. Sutures were removed after seven days. The patients were followed up regularly and oral hygiene statuses was evaluated and were instructed to use chlorhexidine mouth wash and gum paint massage twice daily for 4 weeks²⁰.

Immediately after implant placement, an IOPA and OPG was taken. IOPA radiographs were taken using paralleling (long-cone) technique with the help of RINN framework which was attached to the radiographic cone. Periapical radiographs were taken to see any changes in bone level around the implant on all follow up visits. Provisional crown was removed after 3 months.

After three months of implant placement, the implant was asymptomatic and immobile. No peri-implant bone defects were observed or detected by probing around the implants. For final prosthesis, Custom impression tray was fabricated with auto polymerizing acrylic resin, and then impression was made by using mono-phasic elastomeric impression material.¹⁵ Single porcelain fused metal crown was fabricated and cemented with glass-ionomer cement^{11,12}(Fig.6).



Figure 6: Post Final Prosthesis IRT 13

Post prosthesis placement, IOPA and OPG were taken. With a six months of clinical and radiographic follow up the implant was considered as successful on the basis of the clinical criteria of Albrektson and associates (Fig 7).



Figure 7: Post Operative IOPA

The implant showed excellent soft tissue contours both facially and interproximally.

CASE REPORT 2

A 24-year-old male with missing left lateral incisor due to trauma 4 months back visited for prosthetic rehabilitation. A detail medical and dental history was recorded. A thorough clinical examination, laboratory investigation, radiological examination and assessment of study model were performed. A one piece implant non-submerged, tapered at apical 5 mm, sandblasted, and acid-etched surfaced⁶ with dimension of 3.3 x 13mm was placed with flapless approach. Immediate provisionalization was carried out with temporary acrylic shell crown was cemented with temporary cement and the restoration was cleared from all contact in centric occlusion and during eccentric movements. Final prosthesis was given after 3 months with PFM crown (Fig 8).



Figure 8: Post Prosthesis Placement I.R.T 22

With a six month of clinical and radiographic follow up the implant was asymptomatic and immobile. No peri-implant bone defects were observed or detected by probing around the implants and was considered as successful (Fig 9).

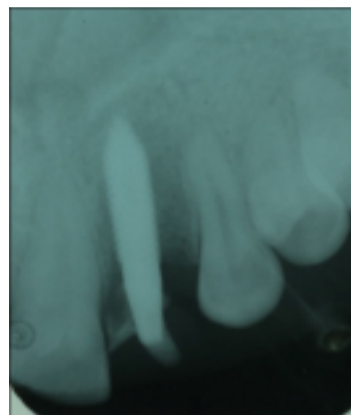


Figure 9: Post Implant Placement IOPA

The implant showed excellent soft tissue contours both facially and interproximally.

DISCUSSION

Missing anterior teeth can impair patients' facial esthetics, produce difficulty in speech and also have an impact on social life. Patients have great expectations that prosthetic

restorations must look like natural teeth. The implant supported prosthesis can overcome these problems and has proved to be a significant addition to the restorative dentistry⁷. One-piece design with no separate abutment screw was used in the present study since advantage of this design is increased strength, elimination of the risk of abutment screw loosening and reduced crestal bone loss due to non-existence of microgap between the abutment and implant⁸. Immediate temporization of single tooth was considered since the site was in esthetic zone and there was need for ideal soft tissue drape.

The advantages of immediate loading are¹⁰

1. As provisional prosthesis is placed after implant insertion, a second surgical procedure is not required.
2. Immediate loading also results in higher bone density around implants.
3. Significantly greater bone-to-implant contact and a reduced crestal bone loss when compared with delayed loading.
4. It contributes for maintenance of adjacent papillae and the height of peri implant tissues.
5. excellent soft tissue emergence.
6. Increased patient comfort.
7. Improved esthetics.

Mohamad Koutrach et al(2010) inferred that provisional crowns could be better termed “anatomical healing abutments,” since they function as healing abutments but lead to a more esthetic gingival anatomy. They create a proper emergence profile, allowing the gingival tissue to be restored to its original architecture, in harmony with the teeth, and they are kept out of occlusal contact to avoid excess distribution of stress to the implant¹.

Disadvantages of non-functional immediate teeth include micro movement of implant that can cause crestal bone loss and acrylic, which may become trapped under tissues or between implant and crestal bone.

The primary disadvantage of immediate loading is the risk of implant failure or greater crestal loss around the healing implants. Overloading of the implant could be a factor for implant failure in immediate loading. Hence, we considered immediate temporization and not immediate functional loading. The one-piece implant design enables undisturbed healing of the peri-implant soft tissue and avoids disruption of the soft tissue seal when placing the definitive prosthetic restoration.

CONCLUSION

The one-piece implant design provides an efficient and easy alternative to two-piece implants for treatment with immediate provisional restorations. Implant survival rate with beneficial marginal bone levels can be attained with this type of implant design. Since immediate non-occlusal loading with one piece implant leads to a better gingival sulcus formation, provides support for papillary growth and maintenance, reduces the treatment time, offers more comfort for the patient with superior esthetic outcome and hence can be considered as an alternative to conventional loading in maxillary esthetic zone, if esthetics is a major criteria^{1,3,9,10}.

Obviously, long-term data are needed to fully evaluate the benefits and risks of one-piece implant with immediate temporization.

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