

Immediate non-functional loading of single tooth implant in esthetic zone – A case report.

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Abstract

Immediate implant loading with provisional crown plays an important role to evaluate aesthetics, phonetics and occlusal function prior to the final implant restoration. There are different methods given in the literature for the fabrication of the provisional crown so clinicians should be aware about them and indications for their use when planning implant restorations. Provisional crown can be given in functional or nonfunctional contact depending upon the primary stability achieved during implant placement. In this case report, immediate provisional restoration having non-functional contact was given to the patient, despite of achieving good primary stability as guided bone regeneration was done due to the presence of bony concavity labially at implant site. Provisional crown was fabricated using composite resin. The aim of immediate loading was to restore function and to achieve a good emergence profile in definitive restoration.

Keywords: Esthetic zone, immediate loading, non-functional loading, provisional crown, single tooth-implant.

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Introduction

When an implant is placed with adequate primary stability it can be immediately loaded to fulfil the needs of the patient. The primary stability reflects mechanical integration of the implant after its placement that is replaced by secondary stability or biological integration later on. Nowadays, resonance frequency analysis has become the best method to check implant stability. Immediate loading is the loading of the implant either functional or non-functional within 2 days of fixture placement.^[1,2] The forces transmitted from occlusion as well as from adjacent structures

like tongue, lips and cheeks through the prosthesis can cause mobility and further, failure of the implant.

Osseo-integration is affected when micromotion is present at the implant-bone interface. Therefore, initial 2-3 months after implant insertion are significant in order to achieve biological integration under load.³ Since, the forces propagated to the implant-bone interface from the prosthesis during the healing period decide the future of the implant, it is very important to differentiate between the various types of loading protocols namely

immediate, functional and non-functional loading. In immediate functional loading, the implant protected occlusion is provided that means light contact in centric relation and no contact in eccentric relation during function, and there is transmission of occlusal forces as well as the forces derived from the adjacent structures to the fixture entirely.^[2,4] In non-functional loading, prosthetic restoration is without any occlusal contacts, which allows an undisturbed healing. Despite this, a certain degree of force is exerted on the implant either from the neighboring structures and functions like chewing, the load and stress transmitted to the implant will be reduced and more controlled.^[2] Immediate restoration provides good emergence profile in provisional as well as in definitive restoration besides restoring other functions.^[5] Therefore, in the present case report immediate provisionalization was done in a single tooth implant to achieve a good emergence profile.

Case Report

A twenty-year-old-female patient came to the department of prosthodontics with a chief complaint of missing tooth in the left front region of the upper jaw. On clinical examination, maxillary left central incisor (21) was missing. After discussing various treatment options with the patient, she gave her consent for prosthetic rehabilitation using dental implants. Conventional implant placement with provisional restoration was planned. Detailed medical and dental history of the patient was recorded. Patient had thick gingival biotype. Diagnostic impressions and models were made. After evaluation of Dentascan, implant of size 3.75 x 11.5 mm

(ADIN Dental Implant System LTD., Israel) was finalized.

The surgical procedure started under aseptic conditions. Local anesthesia was given. A full thickness mucoperiosteal flap was reflected following a crestal incision. Osteotomy was prepared in sequential manner according to the surgical guidelines (Figure 1). Primary stability was checked using resonance frequency analysis (RFA); osstell mentor device (Gotenberg, Sweden) after implant placement and the implant stability quotient (ISQ) value was 69 (Figure 2). It was adequate for immediate loading. After implant placement, an immediate screw-retained provisional crown was made using composite resin. Provisional crown fabrication was done by placing 15° angulated abutment over implant and composite resin added incrementally to give the shape of missing central incisor. The provisional implant crown occlusion was adjusted so that there was no contact with antagonist tooth in centric and eccentric relations (Figure 3). Bone grafting was done labially using xenograft (Cerabone) as there was mild bony defect (concavity) (Figure 4). The finished and polished provisional crown screwed over implant along with the collagen membrane to secure the bone graft at place. After flap-closure, suturing was done (Figure 5). Intra-oral periapical radiographic (IOPA) examination was done (Figure 6). Post-operative maintenance guidelines were explained to the patient. Antibiotics and analgesic were prescribed to patient for five days. Patient was instructed to rinse with 0.2% Chlorhexidine gluconate mouth wash regularly. Sutures were removed after seven days. Six months later, provisional

crown was removed and well-keratinized gingival collar can be seen around the implant (Figure 7). An implant level open tray impression using addition silicone impression material for the fabrication of cement retained final prosthesis a porcelain fused to metal crown. ISQ was checked before placing the definitive crown, the mean ISQ value was 68, adequate for functional loading. After that, definitive crown was cemented with implant protected occlusion. Post-operative IOPA radiograph was evaluated (Figure 8).

Discussion

An esthetically pleasing emergence profile is the aim of any prosthodontic rehabilitation in the esthetic zone using dental implants. To achieve optimal esthetic, implant position and inclination are important factors.^[6] Moreover, the esthetic outcome also depends on gingival biotype. Thick gingival biotype is desirable for esthetic results. Thin biotypes mostly result in recession. It has been also seen that provisionalization done as soon as the implant is placed, there is less midfacial recession when compared to delayed restoration after 1 year.^[7] Immediate loading cases do not require any second stage surgery so patient's acceptance increases as total treatment time also reduces.

The quality of the peri-implant soft tissue is critical to achieve optimum esthetics, therefore, Smith and Zarb's criteria that "an implant must allow placement of a restoration with adequately esthetic appearance especially in anterior region" should be followed along with Albrektsson's criteria of implant success.^[8,9] For this, Pink Esthetic Score (PES) is used for judging the soft tissue around

single-tooth implant prosthesis reproducibly.^[9] A score from two to zero is given for evaluating seven variables soft-tissue level, distal papilla, mesial papilla, soft tissue contour, the alveolar process deficiency, soft-tissue colour and texture. The mesial and distal papillae are judged either by their presence or absence.^[6] The corresponding tooth is used as a reference for assessing all variables. A high score reflects an optimum match of the peri-implant soft tissue with that of the tooth taken as reference. The crown part of the implant restoration that is seen above the peri-implant mucosa can be evaluated by the White Esthetic Score (WES). Its uses variables like outline and volume of the clinical crown, tooth form, surface texture, color, which includes the assessment of the hue and value, and translucency and characterization. A score of two to zero is used for all five parameters as for WES. All these parameters are assessed by direct comparison with the adjacent or contralateral tooth. PES and WES evaluation was assessed by the patient's photograph that was centered at the midline for evaluation of any difference with the corresponding tooth^[6,9,10].

On the basis of these parameters, the optimal score was achieved for implant restoration in the present case. It has been also seen that if implant is placed 3 mm below the level of cemento-enamel junction of the adjacent tooth, good emergence profile can be achieved^[11,12]. In terms of success of immediate loading implants, Ericsson et al found 86-100% survival rate of single-tooth implant with immediate loading.^[13]

On comparing immediate functional loading protocol with immediate non-functional

loading, a controlled study has shown that the survival rate of implant was seen more in the latter case. According to this, nonfunctional loading should be preferred in case of immediate loading of single-tooth implants^[14,15]. But this is controversial as in other studies, no significant difference has been found between immediate functional and non-functional loading protocols^[16,17]. In the present case, despite achieving adequate primary stability, non-functional occlusal contact is given due to labial bone defect so as not to disturb implant bone interface by direct occlusal forces.

Guided bone regeneration (GBR) was done to cover the labial bone defect. Good esthetic outcome has been reported in case of GBR for both immediate and conventionally loaded implants as it restores both hard and soft tissue outform. Immediate provisional restoration helps in creating emergence profile that is another factor imparting good esthetic result by shaping the soft tissues around the implant^[18]. In the present case, a satisfactory and esthetically pleasing emergence profile was achieved.

Conclusion

Immediate loading is a useful and recommendable procedure, in terms of the clinical outcome, success and survival of the implant when comparing to that of conventional loading. Therefore, in case of adequate primary stability, immediate loading protocol can be followed for restoring immediate function. Also, by immediate provisionalization a good emergence profile can be achieved for patients having high esthetic demand. Hard and soft tissue

evaluation is also critical in clinical decision making.

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FIGURES



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8

