Immediate loading of single stage implants with minimally invasive surgical technique for maximizing esthetics: A case report.

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Abstract:
The predictability of dental implants using the two staged approach has been well documented. Since its inception, it has been progressively challenged to decrease treatment time, minimize the number of surgical procedures, and to maximize esthetic outcomes. Nowadays, in specific clinical situations, implant placement with single stage approach with minimally invasive surgical technique can be designed to improve the esthetic outcome and patient's comfort as well. In the present study, two cases were rehabilitated with single stage dental implants placed with minimally invasive surgical technique in the esthetic zone.

Keywords: Esthetics, Single stage implant placement, Minimally invasive surgical technique, Osseo-integration.

INTRODUCTION
The present state of art of implant dentistry with ever increasing demand for esthetics has constantly challenged the treatment team. The last decade has seen a profound shift in implant dentistry from function to esthetics, with esthetics enhancing the patient's need and desires. The delicate balance between the function and esthetics must be maintained as they both complement the treatment outcome or it can be well assumed that, “Function should complement esthetics and vice versa”

Switching from the lengthy healing original protocols to immediate loading has demanded a veritable intellectual revolution, a cognitive rupture, a paradigm shift. Immediate loading of dental implants not only includes a non submerged one stage surgery, but actually loads the implant with a provisional restoration at the same appointment or shortly thereafter without compromising osseointegration.¹ The use of single stage implants has obvious advantages because patients can be rehabilitated for immediate function, aesthetics and phonetics.²
With the high predictability of osseointegration, the current trend is gearing towards the development of various implant placement protocols to enhance patient's function, esthetics and comfort with a minimally invasive approach. The punch technique provides a method that highly reduces associated surgical morbidity, and increases patient acceptance.[3]

This case report presents two clinical cases of immediate loading of single tooth implants placed in the esthetic region with minimally invasive flapless approach.

**Case Report (Figure Ia to Ij and Ila to Ile)**

A twenty two year old male reported to the Department of Periodontology and Oral Implantology with complaint of missing maxillary left central incisor and a thirty three year old female with missing maxillary left canine and desired to get it restored.

The medical history of the patient was non contributory. The surgical site revealed sufficient bone width and height with healthy and stable soft tissue architecture for implant placement. The buccolingual and mesiodistal width of the edentulous ridge was adequate to receive a fixture of 3.5 mm wide and 13 mm long on the basis of clinical and radiographic examination.

Adequate instructions were given regarding oral hygiene maintenance for the success of implant therapy and were constantly reinforced till satisfactory levels were achieved. Then, the basic principle of health care to sign the consent form was accomplished by giving sufficient information about the proposed treatment protocol. The study was approved by institutional ethical committee based on Helsinki declaration.

Under local anaesthesia, planned site for osteotomy was marked with the help of a periodontal probe using presurgical prosthetic guide template. A manual 3mm soft tissue punch was used around the marking till alveolar crest was felt. Then, a periosteal elevator was used to expose the alveolar crest. Then, lance drill was used to mark the alveolar crest through the fissure prepared in the template. Atraumatic osteotomy preparation was done with twist drill of 2 mm diameter at a speed of 1000-1400 rpm under copious saline irrigation specific to the implant dimensions. Paralleling pin was used to check angulation with the adjacent teeth followed by placement of 3.5mm wide and 13 mm long implant. After ensuring primary stability (indicated by insertion torque of 30 Ncm or more), immediate loading of the implant was done by fixing abutment of required dimension into the implant with the help of abutment driver.

Then, abutment level impression was made for the fabrication of definitive restoration. The impression cap was disconnected from the implant and transferred to the cast using an abutment analog and a definitive metal ceramic crown was fabricated in the laboratory which was cemented with glass ionomer cemented within 24 hours. A periapical radiograph was taken immediately after crown cementation to ensure immediate contact between the implant, crown and abutment.

The patient was instructed to perform cold packing on the surgical area extraorally on the day of surgery followed by hot fomentation. Post operative medication included amoxicillin 500 mg every 8 hours for 5 days and ibuprofen 400mg every 4-6 hours or as needed for pain. Chlorhexidine rinses 0.2% twice daily for 15 days was advised for local antimicrobial effect.

**Results:**

Postoperative healing was uneventful with no signs of postoperative complications in both the cases. Patient satisfaction was excellent as reported both immediately and
one week after surgery. At one year of follow up visit, the soft tissue appeared healthy and esthetically pleasing and no significant bone loss observed during one year radiograph when compared from radiograph taken at the time of crown cementation.

Fig. Ia: Preoperative photograph  
Fig. Ib: Punch to expose the osteotomy site  
Fig. Ic: Occlusal view after soft tissue excision  
Fig. Id: osteotomy preparation  
Fig. Ie: Implant placement  
Fig. If: Abutment place
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Fig. Ig: Definitive porcelain fused to metal restoration

Fig.Ih: IOPA of site

Fig.Ii: IOPA at 6 months

Fig.Ij: IOPA at 12 months
Discussion

The present report shows evidence of successful use of single stage implant surgery for immediate loading of dental implants. Also, patient's desires for shorter treatment periods and preservation of the esthetic appearance at all stages of the treatment have stimulated clinicians to explore immediate loading of dental implants. The meaning of successful implant therapy is no longer judged only by osseointegration but also the precise duplication of the gingival profile as that exist around natural dentition. The advantage of minimally invasive flapless technique when combined with immediate loading are remarkable as immediate esthetics can be achieved without the disruption of normal architecture of the interdental papillae or the gingival margin. Use of surgical technique without flap reflection conserves the crestal bone and minimizes the soft tissue recession since no subperiosteal flap is raised, there is never any disruption of the blood supply to the alveolar bone for the maintenance of gingival frame.\textsuperscript{[4,5]}

The feasibility of flapless implant surgery with immediate loading has been demonstrated in studies by Hahn J\textsuperscript{[6]} and Rocci A.\textsuperscript{[7]} However, appropriate case evaluation should be accomplished. These include adequate amount of keratinized
tissue, sufficient bone width and height and absence of soft tissue undercuts.

Existing literature concerning the desirability of keratinized tissue around endosseous implants have shown inconclusive results. Wennstrom\(^{[8]}\) reported that the absence of keratinized tissue is not critical to the health of the gingival tissue and implant prognosis whereas Wood et al\(^{[9]}\) suggested that the failure rate is higher when there is an absence or small amount of keratinized tissue.

Several requirements need to be present to ensure long-term success of immediately-loaded implants. These include: (1) primary stability of the implant, (2) excellent bone density for the implant bed, and (3) elimination of micromotion in the bone-implant interface during the healing period.\(^{[10]}\)

**Conclusion**

To conclude, the cases presented in the report demonstrate a successful osseointegration of single stage implant placement with minimally invasive surgical technique in the esthetic zone. It is the implant surgeon who should always build the decision to place single stage dental implants by flapless approach based on his or her own surgical expertise and technique. Immediate loading of implants is a predictable procedure provided patient selection and surgical technique are appropriate.

**References**