Immediate implantation and provisionalization: Single-tooth restoration in the esthetic zone

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terior tooth loss and restoration in the esthetic zone as a common challenge in dentistry today. The prominent visibility of the area can be especially distressing to the patient and requires a timely and esthetically pleasing solution.

Immediate single-tooth implantation followed by immediate provisionalization is becoming an increasingly desirable treatment option. It offers numerous benefits over conventional delayed loading.

In the past, the non-restorable tooth was extracted and possibly grafted for site preservation. A removable partial denture (or flipper) was fabricated and placed for use during healing. After an adequate healing period, an implant was placed and buried under the gingiva, and the patient continued to wear the flipper until the implant had osseointegrated and was ready to be uncovered and restored. The patient would therefore wear the removable partial denture for upwards of six to eight months. This course of treatment often resulted in alveolar ridge resorption, leading to a significant loss of bone stability.

Currently, immediate implantation and provisionalization of single anterior teeth minimizes treatment time and cost while enhancing esthetic quality. In addition to alleviating patient trauma, this technique decreases resorption of hard and soft tissue and results in better function. Overall, this leads to greater patient satisfaction.

In this process, the implant is placed and provisionalized immediately. A non-functioning, also known as non-occluding, provisional is used in a protected occlusal scheme.

The placement of the non-occluding restoration must occur within 48 hours to be considered immediate loading. Both of the following cases received same day provisionalization and restoration.

The clinician faces several challenges when restoring teeth in the esthetic zone. Major cosmetic concerns in the fabrication of the immediately placed provisional are the retention of the interdental papilla and prevention of alveolar bone collapse. Research has suggested that immediate provisionalization following implantation allows for greater clinical control over the regeneration of tissue surrounding the site of extraction. Unfavorable alterations to the alveolar bone structure must be avoided using ridge preservation techniques and precautions in terms of osseous exposure.

Immediate placement of the implant into fresh extraction sockets prevents the post-extraction resorption that occurs commonly with alternate forms of treatment, preserving the integrity of the alveolar ridge. A compromised implant site is also a concern when dealing with tooth loss. Bone resorption may leave insufficient bone for implantation. Furthermore, a compromised foundation greatly influences the emergence profile. Immediate implantation into the fresh extraction socket allows the clinician to maintain the gingival tissue and create a more esthetically pleasing restoration.

Minimum criteria for implant placement have been established for successful immediate loading. Rough quantitative values for insertion torque and implant stability quotient (ISQ) as well as surgical assessment play a role. Values as low as 15 N-cm for insertion torque and 50 ISQ both resulted in successful provisionalization. Additionally, the surgeon must assess where there is adequate bone support at the apex, at least 5 mm of circumferential bone, and primary stability of the implant. Research has shown that “early loading of dental implants does not appear to interfere with osseous modeling of a developing osseointegration as long as significant micromovement does not occur.” In addition to providing both esthetic and functional benefits, immediate loading minimizes forces. The provisional crown was fabricated to enhance retention. The provisional was polished and emergence of the provisional as a provisional was explained to the patient. He decided to continue treatment with an immediate implant restoration. The patient was then referred to a periodontist for further evaluation and implant consultation.

Implant evaluation

Implant examination revealed adequate bone height and width for implant placement immediately following extraction of the failing tooth. A surgical date was scheduled with the periodontist for extraction of the tooth and placement of the implant. An appointment was coordinated with our office for the patient directly following the surgical procedure for provisionalization of the implant.

Surgical protocol

The right central incisor was removed and a NobelReplace Tapered Groovy (internal conec- tion) 5.0 mm x 15 mm implant was placed. An osseous graft of demineralized freeze-dried bone and a collagen membrane were utilized to augment the surgically created site. The fixture received an emergence profile, healing abutment.

Provisionalization

The patient presented in our office after the implant placement with a healing abutment in place. The healing abutment was removed. A NobelProcera immediate temporary abutment was placed and a provisional was fabricated. Care was taken to contour the emergence of the provisional as to best support the gingival architecture. The plastic coping for the immediate temporary abutment was roughened with a 56 carbide bur to enhance adherence of the integrity provisional material used.

The provisional was polished and placed on the immediate temporary abutment with a small amount of flowable composite to enhance retention. The provisional crown was fabricated to be completely out of occlusion and non-functional to ensure the implant adequate osseointegration time undisturbed by occlusal forces. The provisional restoration was observed periodically during the six-month healing process to monitor gingival adaptation.

Final restoration

Six months post surgery, the patient was scheduled for placement of the final restoration. After removing the provisional crown and the immediate temporary abutment, an implant impression post and placed, radiographic verification was made to assure complete seating and a final impression was taken with a polyether system. Complex shade-mapping was carefully performed to match the existing contralateral natural
teeth. The provisional was then reinserted.

A Procerza zirconia custom im-
plant abutment was chosen. Zirconium implant abutments have not only been noted for their tooth-like color and esthetic ap-
ppearance but also for tissue tolerance,
high load strength and intraosseous-
design enhancement.13

The extraordinary load strength of
the abutment is not com-
promised by high bending and
tensile strength, and fracture and
chemical resistance.13

Zirconium abutments are me-
chanically equivalent to their
metal counterparts but boast
greater biological compatibility.11

Recent peripapry radiographs
showed internal resorption in the
upper incisors (Fig. 5). The pa-
tient sustained additional trauma to
the maxillary right central incisor
through a fall, which resulted
in complete fracture of the crown
(Fig. 7).

Case study 2: fractured maxil-
mary right central incisor

This patient, a healthy male in his
late 30s, was examined in my office
for a correct emergence profile of
his maxillary right central incisor.

The patient had Feldspathic porcelain restora-
tions on his upper central and
upper lateral incisors that were
placed several years ago. He had
to a history of trauma to the anterior teeth from a sports injury and sub-
jacent endodontic treatment. Recent periapical radiographs
showed internal resorption in the
upper incisors (Fig. 5). The pa-
tient sustained additional trauma to
the maxillary right central inci-
sor through a fall, which resulted in
complete fracture of the crown
(Fig. 7).

The tooth was nonrestor-
able. After reviewing the diff-
ereing treatment options, the patient de-
cided on immediate non-functioning
restoration. Although the maxil-
lar left central incisor also exhib-
ted signs of internal resorption, it
was decided that treatment of
that tooth would be performed at
a later date. Consideration was
given to the poor gingival archi-
tecture that resulted from placing
adjacent implants in the esthetic
zone. He was then evaluated by the peri-
odontist for the surgical place-
mement of the immediate implant
for the maxillary right central
incisor. The patient’s treatment was
similar to that of the patient in

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