

Immediate implant placement and loading with single tooth implants - practice guidelines

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The practice of immediate implant placement and simultaneous immediate loading is gaining momentum in clinical practice and can be a very rewarding way to deliver implant therapy to our patients. However, this technique does represent a significant departure from more traditional dental implant protocols and techniques. Consequently, appropriate patient selection and an understanding of newly developed techniques/protocols are needed to ensure that the high rates of success seen with conventional implant therapy hold true for implants placed and restored immediately.

While gaining in popularity in recent years, immediate implant placement and loading is technically challenging and should only be undertaken by clinicians with considerable experience in implant dentistry, both surgically and prosthetically. Clinicians not familiar with immediate placement and loading techniques are urged to consult the literature and seek appropriate continuing education/mentoring on the subject before embarking on this treatment modality in their daily practice.

In the anterior aesthetic zone, the addition of immediate loading can further enhance the treatment experience for the patient by allowing fewer surgical visits as well as providing immediate aesthetics. From the clinicians standpoint, it can offer other advantages, especially in cases where immediate extraction and implant placement is undertaken.

Immediate placement and provisionalisation for single tooth replacement allows for minimal disruption to the marginal soft tissues providing immediate prosthetic support for the peri-implant tissues through the use of a carefully crafted provisional restoration. The provision of customized immediate provisional restorations with appropriate subgingival emergence profile can be of significant benefit in providing stability of the peri-

implant tissues immediately post extraction and maintaining the stability of the gingival margin necessary for a successful aesthetic outcome. Careful manipulation of the marginal tissues is critical to a successful outcome with intrasulcular incisions, no or minimal flap reflection (where possible), ideal implant positioning with respect to implant depth as well as buccal-palatal and mesio-distal aspects.

Table I. Contraindications to immediate implant placement into extraction sockets

- Avoid teeth with large or acute periapical infection;
- Teeth labial bony dehiscence or fenestration defects;
- Insufficient bone apically to ensure primary stability of the implant;
- Systemic factors that may impair healing (e.g. smoking);
- Large bulbous root morphology or convergent roots;
- Interproximal bone loss (aesthetic zone), active periodontitis.

The most challenging aspect of immediate implant placement and immediate loading cases are ensuring adequate implant stability within the extraction socket and fabrication of an appropriate provisional restoration which will support optimal soft tissue healing.

Implant placement into extraction sockets is now regarded as a very predictable treatment modality, but brings with it its own challenges. There are



Figure 1. Initial presentation just prior to extraction of tooth 11.



Figure 2. Intrasulcular incisions, flapless incision and atraumatic tooth extraction.

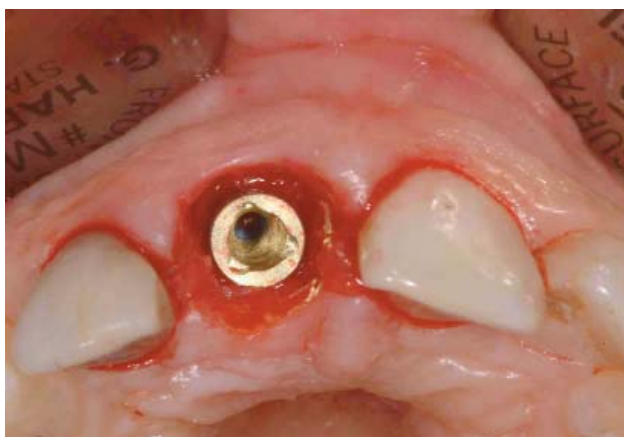


Figure 3. Immediate placement of regular platform NobelSpeedy Replace implant slightly toward the palatal aspect of the extraction socket.



Figure 4. Attachment of the immediate provisional abutment to the implant in the 11 position.

well-recognized contraindications with respects to immediate implant placement (Table 1). In the anterior maxilla, implant placement is typically undertaken toward the palatal aspect of the extraction socket. Care needs to be taken in the osteotomy preparation in the palatal wall of the extraction socket as this is typically very dense and difficult to prepare. Appropriate countersinking of the palatal wall does need to be undertaken to prevent the “kicking out” of the implant head towards the labial aspect during placement.

Implant primary stability of 35Nc-45Ncm (insertion torque) is required when contemplating immediate loading of the implant. Resonance Frequency Analysis (RFA) could also be used to confirm primary implant stability at the time of surgery. If poor primary stability is achieved (less than 20Ncm), it may be

Table 2.
Contraindications specific to immediate loading cases

- Patients with parafunctional habits, bruxism, deep anterior overbite;
- Lack of primary implant stability (<35Ncm);
- Use of short implants, non-threaded or press-fit implants;
- Non-compliant patient;
- GBR in conjunction with implant placement (prefer 2-stage protocol with primary closure of soft tissues at stage I surgery).

necessary to revert to placement of either a coverscrew and submerge the implant or if moderate primary stability is achieved (20-30Ncm insertion torque) placement of a healing abutment may be indicated (single stage placement). If the extraction socket does not have intact bony walls and there has been loss of bone where GBR is required, immediate loading is contraindicated and the implant should be submerged for optimal healing (2-stage protocol). Further contraindications for immediate loading are included in Table 2.

There are many options when it comes to immediate provisionalisation of single tooth implants. The method adopted is often related to the clinician’s preference toward either cement- or screw-retained implant restorations. Lab formed provisionals can be made prior to surgery and offer the advantage of ease of placement



Figure 5. Fabrication of immediate provisional crown at chairside with Luxatemp. Finishing touches and polishing are undertaken out of the mouth, shown here on an immediate provisional abutment attached to a 'dummy implant'.



Figure 6. Provisional crown completed and ready for placement on the immediate provisional abutment.

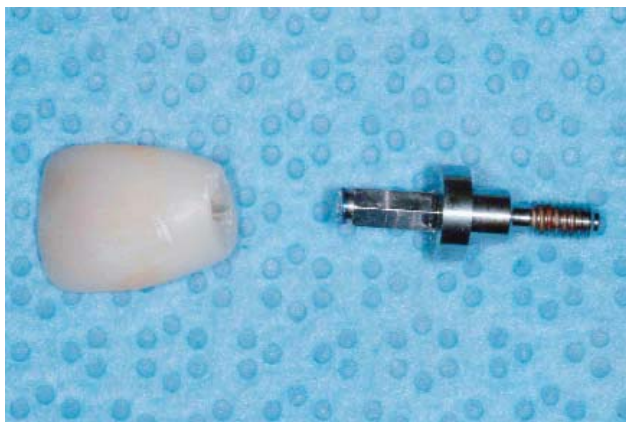


Figure 7. Exploded view showing the Immediate Provisional Abutment (IPA) and the provisional crown. The IPA is a non-engaging one-piece screw abutment.



Figure 8. The completed Luxatemp crown seating in checked on the IPA to ensure excellent marginal fit, prior to delivery into the mouth.



Figure 9. Provisional crown is cemented with Tempbond to the immediate provisional abutment. Two vicryl sutures are placed interdentally to help adapt the marginal tissues.



Figure 10. Three months post-op. Note excellent gingival aesthetics, absence of recession, maturation of the interdental papilla. This image was taken just prior to final fixture head impression and fabrication and placement of final implant abutment and crown.



Figure 11. Initial presentation. Tooth 11 had severe root resorption and required extraction. Note highly scalloped gingival architecture and moderate gingival biotype.



Figure 12. Great care needs to be exercised to ensure atraumatic extraction using a flapless surgical approach. Intraculcular incisions and periosteal flaps are used before the tooth is extracted with forceps.

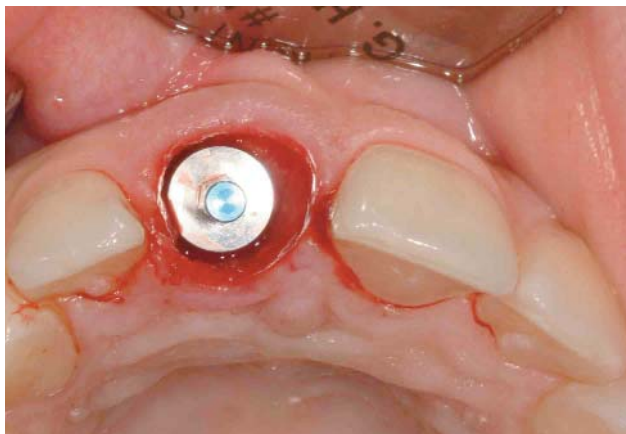


Figure 13. Immediate placement of a wide platform (5.0mm) NobelSelect Tapered implant with a wide platform IPA which is screwed into position with a multi-unit abutment driver.



Figure 14. Labial view of the IPA providing an indication of fixture head depth in relation to the free gingival margin on the mid-labial aspect.

and excellent finish, however it can add to the cost and complexity of the treatment. More commonly, provisional crowns for single tooth implants are fabricated at chairside. Provisional crowns can be made on screw retained temporary abutments which can be either plastic or titanium. The main advantage of the screw-retained provisional is that the problems associated with excess subgingival cement are avoided. The downside is that the fabrication of screw-retained provisional is often best undertaken in the laboratory rather than chairside. The advent of the Immediate Provisional Abutment (IPA) by NobelBiocare has further simplified the immediate provisionalisation for single tooth implants in recent years. This provisional abutment is available for both

NobelReplace and Bränemark implants and supports placement of a cement retained provisional restoration made at chairside.

The abutment is non-engaging, screw retained and placed with a multi-unit abutment driver. The abutment has a 1.5mm high shoulder and comes with a plastic coping which can be used with acrylic provisional materials. Fabrication of the provisional restoration involves placing the abutment onto the implant and torquing it to 25-35Ncm. Isoform crowns can be used along with acrylic or alternatively clear plastic crown forms with composite (Luxatemp) which is then seated over the immediate provisional abutment and light-cured. Ideally, slight reflection of the gingival margin allows direct visualization

of the provisional restorative material up against the shoulder of the immediate provisional abutment. This also enables the clinician to ensure no excess material flows into the surgical site or extends apically to the abutment shoulder. Any excess material should be removed and the provisional crown polished to seat flush on the shoulder of the abutment. Shaping and finishing of the provisional crown is undertaken out of the mouth and a replica of the IPA is very useful for this purpose as it allows for easier handling of the provisional crown (Figure 6).

The provisional crown is then cemented with temporary cement such as Tempbond. The close fit typically seen between the provisional restoration and the IPA can



Figure 15. The existing natural crown was used to fabricate the immediate provisional crown in this case. The natural crown was carefully hollowed out, etched and primed then filled with composite and adapted to the immediate provisional abutment. The subgingival component of the composite was then polished extra-orally before the provisional crown was cemented with provisional cement (Tempbond).



Figure 16. Clinical appearance three months post surgery following removal of the temporary crown prior to fixture head impression. Note excellent preservation of the gingival aesthetics and in particular the prosthetic support of the interdental papilla.



Figure 17. Occlusal view immediately following removal of the provisional crown, just prior to removing the IPA. Note the preservation of the labial gingival contour provided by the immediate provisional crown.



Figure 18. IPA removed and closed tray fixture head impression coping in place clinically just prior to the final impression.

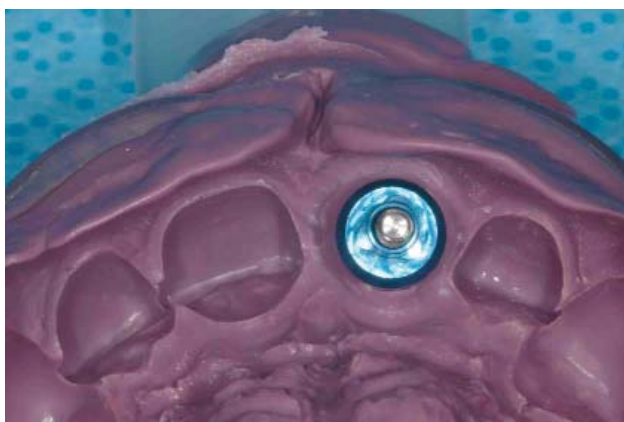


Figure 19. Fixture head impression showing impression coping and recording of the surrounding subgingival architecture of the emergence profile.



Figure 20. Final Zirconia implant abutment and crown placement.

occasionally result in difficulty with seating the temporary crown due to positive hydrostatic pressure. This can be minimized through using only a small amount of temporary cement and by seating the temporary crown on an analogue first to expel the excess cement before delivering the temporary crown to the abutment in the mouth. Another possibility is to vent the provisional crown. It is important to ensure the provisional crown is fully seated on the IPA as a gap between the temporary crown and the IPA will result in inflammation of the peri-implant tissues. Always check to ensure there is no excess cement subgingivally before suturing the gingival tissues around the provisional crown.

When fabricating and placing immediate provisional crowns, always ensure very light or no contact in centric relation with the opposing arch, avoid all contact in lateral excursions and protrusive. This will reduce the chance of occlusal trauma to the newly placed implants and ensure optimal conditions for osseointegration. It is also imperative to advise and remind patients that only light occlusal forces should be applied with eating for the first

4-6 weeks post surgery. Patients should be monitored closely during the immediate post-operative period to confirm a normal course of healing, especially over the first 4-6 weeks post surgery.

Implants are typically allowed to osseointegrate for three or more months before

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patients return for final fixture head impressions and fabrication and placement of the definitive implant abutment and crown.

In summary, immediate implant placement and loading is likely to continue to evolve with innovative product development and techniques. At this time, the IPA offers a simple and highly effective means by which single tooth implant cases can be immediately restored. Clinicians should however be aware that immediate loading in conjunction with immediate implant placement for single teeth is still generally regarded as a higher risk procedure and should only be attempted

by experienced clinicians well versed in both surgical and prosthetic aspects of implant dentistry. Patient selection is critical and having the right armamentarium and surgical acumen is also imperative to ensure a successful treatment outcome.

About the author

Dr Michael Danesh-Meyer is a specialist periodontist in private practice in Auckland. He was a Clinical Assistant Professor in Periodontology and Associate Scientist in the Laboratory for Applied Periodontal and Craniofacial Regeneration at Temple University, School of Dentistry in Philadelphia, USA. He has been involved in pre-clinical and clinical research involving Guided Tissue Regeneration/Guided Bone Regeneration and dental implants since 1991, has authored numerous scientific articles and lectures both nationally and internationally on topics related to implant dentistry and tissue regeneration therapy. He established the Institute of Dental Implants & Periodontics and Auckland Clinical Training Centre in 2000 and is Director of Dental Education Continuum.