Clinical Showcase

Clinical Showcase is a series of pictorial essays that focus on the technical art of clinical dentistry. The section features step-by-step case demonstrations of clinical problems encountered in dental practice. This month's article is by Dr. David French. If you would like to propose a case or recommend a clinician who could contribute to Clinical Showcase, contact editor-in-chief Dr. John O'Keefe at jokeefe@cda-adc.ca.

Extraction and Immediate Placement of the NobelPerfect Scallop Implant: A Novel Technique for Cement-Retained Provisional Crowns

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The immediate placement of an implant into an extraction socket along with immediate placement of a temporary crown represents a significant advance in therapy for patients who have lost an upper anterior tooth. This procedure does not interfere with the patient's lifestyle and provides a functional and esthetically pleasing result that cannot be matched by a temporary removable prosthesis. Given the anxiety that patients feel on loss of a critical, highly visible tooth, they usually have high expectations for both the interim and final results.

Placement of implants into extraction sockets is still an emerging technology, and several implant designs have been developed recently for this purpose. Most are tapered implants with roughened titanium to improve primary fixation and to facilitate osseointegration. One of the most recent designs is the NobelPerfect scalloped implant (Nobel Biocare, Goteborg, Sweden). The advantage of the scalloped implant is that it positions the implant–crown margin apically at the facial and palatal surfaces, which allows for placement of the margin 1–2 mm subgingivally on the buccal, lingual and interproximal margins simultaneously. This reduces the need for deep interproximal margins (to ensure no display of the facial margins) and in theory will limit the depth of interproximal bone loss caused by the microgap between implant and prosthesis. The scallop design should be particularly beneficial when 2 adjacent implants are planned, because it may allow for preservation of inter-implant bone height.

Ideally, immediate implant placement is performed with the implant engaging the palatal wall of the socket and the implant axis directed just palatal to or at the incisal edge. The NobelPerfect implant was designed with a screw-retained temporization coping. This type of temporary coping may not be favourable in all cases, as it may lead to facial or incisal screw access that will affect the esthetic quality of the temporary crown (**Fig. 1**). We have found that the final abutment of the NobelPerfect implant, used as an interim abutment (in conjunction with the coping as a base for a resin-fabricated temporary crown), provides a better esthetic result by allowing for a cement-retained immediate temporary crown. Because the NobelPerfect system requires a fixture-level impression, this interim ("final") abutment should not be positioned with 35 Ncm torque. The use of a cement-retained temporary crown increases the cost because of the need for an additional abutment but is considered appropriate, given the high expectations of patients for good temporary esthetic appearance.

We present a case in which we chose the scalloped implant because we suspected possible long-term loss of a tooth adjacent to the site of immediate implant placement. The cement-retained temporary crown provided good esthetics, and, through preservation of the soft-tissue form, an excellent final result was achieved.

Case Report

The patient presented with radiolucent areas associated with previously retrofilled teeth 21 and 22. The prognosis for tooth 21 was hopeless and that of tooth 22 was questionable; however, the patient opted to retain tooth 22, as it was symptomless. A bridge from tooth 11 to tooth 22 was an option; however, the uncertain endodontic prognosis for tooth 22 precluded this as a valid long-term choice. An immediate implant technique was chosen to preserve the soft-tissue contours. The patient had a high smile line and was concerned about the impact of a partial denture on her speech if traditional extraction and delayed implant placement were performed (**Figs. 2** and **3**).

The NobelPerfect scallop implant was selected to preserve the papilla in anticipation of the eventual loss of tooth 22 and its replacement with an implant. The use of a scallop implant is beneficial primarily in situations where adjacent implants are present because it allows preservation of interdental bone.

To preserve the thin buccal plate, the extraction was performed without incisions or a flap; a buccal flap would compromise the vascularity and lead to recession, and elevation of the papilla might lead to some loss of papilla height. The use of a periotome is critical for this type of extraction, as it requires minimal luxation and thus allows preservation of the buccal plate. As shown in **Fig. 4**, the buccal plate was intact about 2 mm below the facial gingival margin.

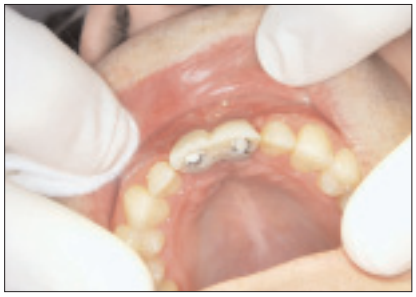

Figure 1: *The conventional screw-retained temporization coping of the NobelPerfect implant is convenient only if the access hole is lingual to the incisal edge.*

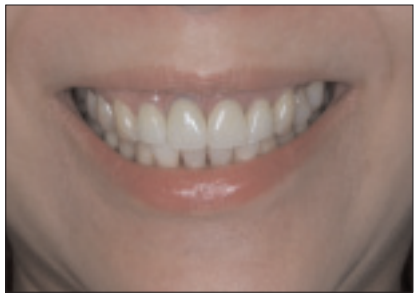

Figure 2: *Pretreatment photograph showing natural high smile line.*

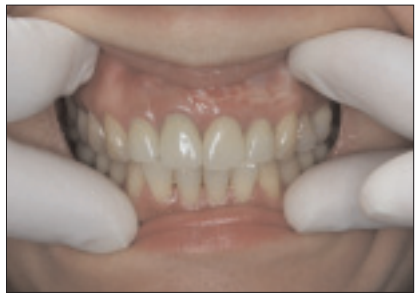

Figure 3: *Pretreatment photograph with lips retracted. Vestibular scar tissue from the previous retrofilling is visible.*

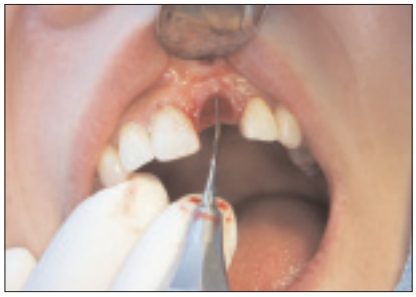

Figure 4: *Extraction of tooth 21 with assistance from periotome device allows preservation of the buccal plate.*

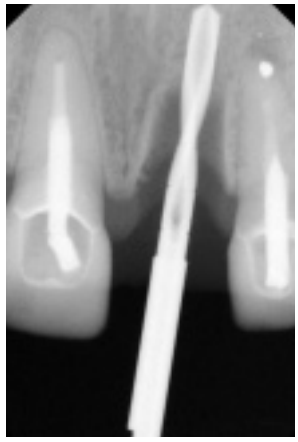

Figure 5: *Pilot drill engaging the bone beyond the apex of the socket.*

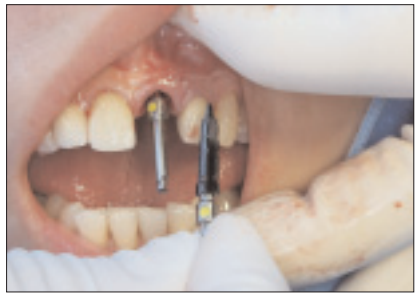

Figure 6: *The use of a tapered drill reduces the risk of perforation of the apical undercut during the osteotomy procedure.*

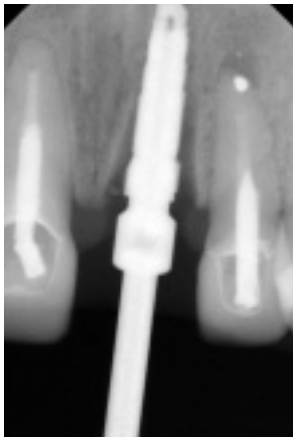

Figure 7: *Tapered drill in socket.*

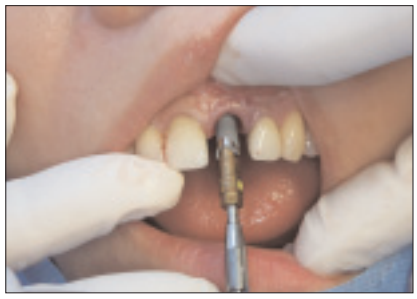

Figure 8: *Insertion of a tapered scallop implant in socket. The scallop design allows for only 2 positions of rotation on final insertion.*

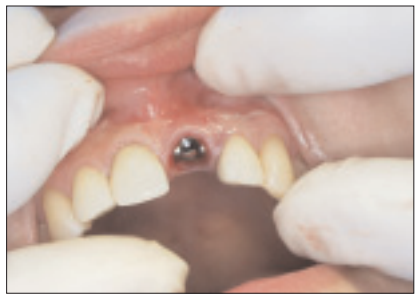

Figure 9: *The implant is seated with the facial implant shoulder positioned 1–2 mm subgingivally from the facial margin. The insertion torque is sensitive to technique; it must be adequate for immediate loading (over 35 Ncm) but not so great that it causes compression necrosis.*

For immediate implant placement, the pilot hole is started on the palatal wall of the extraction socket to avoid perforating the undercut that is typically found at the apex of the maxillary anterior teeth (**Fig. 5**). A tapered drill (**Figs. 6** and 7) is recommended, as it has a narrow apical profile, which reduces the risk of perforation of the buccal plate beyond the apex of the socket. The insertion of all tapered implants is sensitive to technique, as compression necrosis may arise if excess torque is used when the implant is inserted. Placement of the NobelPerfect implant is particularly difficult, because the implant has only 2 positions of rotation that are clinically acceptable (**Figs. 8** and **9**) and the implant shoulder is equivalent to the crown margin, so depth of placement is critical.

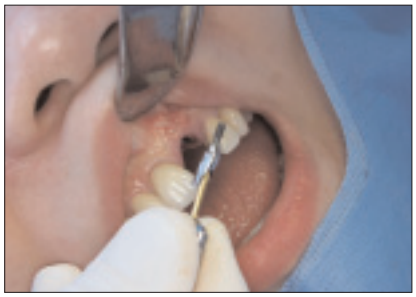

Figure 10: *The interim "final" abutment with a temporary abutment screw.*

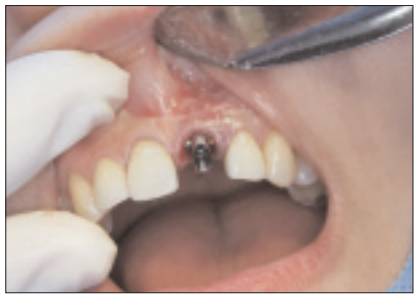

Figure 11: *The angled abutment is in position, and the screw has been placed with minimal insertion torque of about 10 Ncm.*

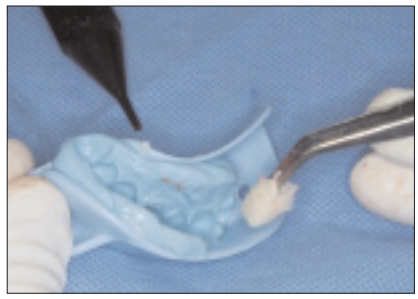

Figure 12: *The Protemp crown on removal from the bite registration placed over the burnout coping.*

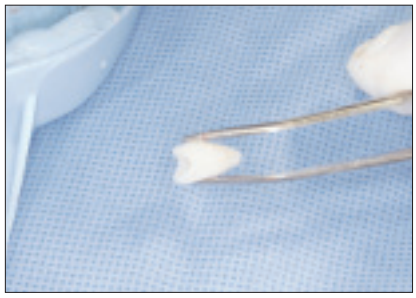

Figure 13: *The Protemp crown after removal of the flash. Note the scalloped form of the temporary crown.*

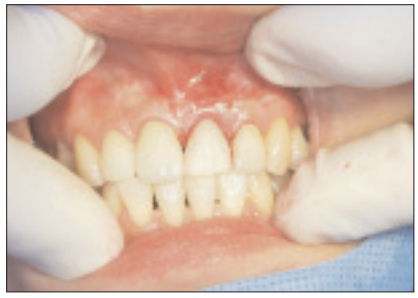

Figure 14: *The temporary crown seated in place.*

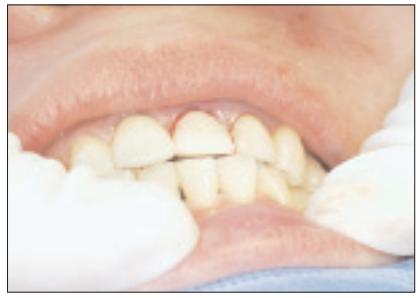

Figure 15: *The temporary crown must be checked for occlusal clearance.*

The implant should be placed with a small gap between the facial surface of the implant and the buccal plate. If this is not done, the buccal plate may be compressed, which could result in loss of the buccal plate and significant recession.

The manufacturer now provides a screw-retained temporary abutment for the NobelPerfect system, but when this case was treated, such a screw-retained temporary abutment was not available. We have found that using a final abutment with the burnout coping as a base worked well for temporization; however, a second "final" abutment must be purchased for the laboratory to use after a fixture impression is made. This cement-retained system works better than the screw-retained temporary crown designed for the NobelPerfect system, as it alleviates problems related to screw access.

If the implant is placed ideally for soft-tissue support, the point of screw access will be at the incisal edge (**Figs. 10** and **11**); therefore, the interim "final" abutment was used in this case to avoid the need for a screw access hole. There are 2 abutment selections: straight and angled. The selection of abutment type is made at chairside to allow the best compromise between facial clearance for porcelain thickness and occlusal clearance. The abutment is not torqued into position at a full 35 Ncm so that the abutment can be changed after the laboratory procedures.

Before the extraction, an impression was taken with bite registration material in a stock tray; this impression was used as a template for the temporary crown. The burnout coping provided for the selected abutment was scored to improve retention of the composite and was placed on the abutment intraorally. The temporary crown was made by injecting Protemp II composite [3M ESPE, St. Paul, Minn.] into the bite registration and seating the impression over the abutment. A direct methylmethacrylate temporary restoration is not advisable because of the risk of heat damage to the implant (**Figs. 12** and **13**).

The temporary crown was seated in place with a minimal amount of cement, to reduce the possibility of cement being forced into the residual gap between the socket bone and the implant (**Fig. 14**). The temporary crown was kept out of occlusion, and the patient was counselled to avoid hard foods for 4 weeks (**Figs. 15**). The patient must have no parafunctional habits and must have a favourable occlusion for immediate placement of a provisional crown. The patient must be reminded that although the implant feels normal and is not painful, implant fixation is weakest between 2 and 3 weeks after the procedure, as the bone undergoes initial resorption and remodelling before final osseointegration. In this case, the patient was seen for standard 1-week (**Fig. 16**) and 3-week postoperative follow-up.

At 12 weeks a radiograph (**Fig. 17**) was obtained to confirm successful integration and bone fill in the socket (**Fig. 18**). The temporary crown and abutment were

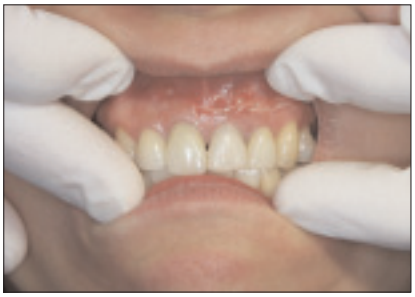

Figure 16: *One week after the procedure, the tissues were healthy, there was no recession, and the patient reported no pain.*

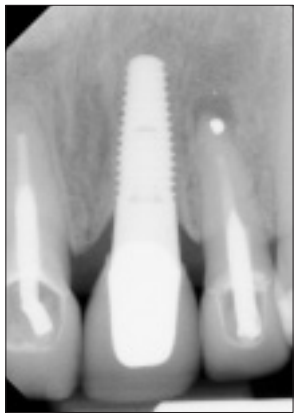

Figure 17: *Twelve weeks after the procedure, there is successful integration and bone fill in the socket.*

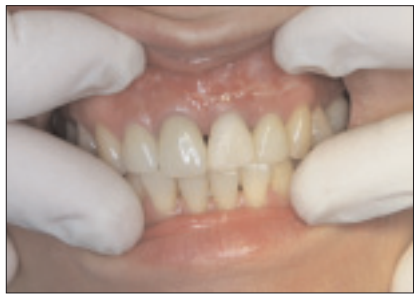

Figure 18: *Temporary crown at 12 weeks after the procedure; no recession is visible.*

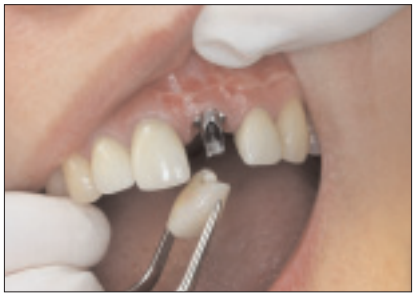

Figure 19: *The temporary crown and the abutment were removed, and the implant torque was tested to 35 Ncm.*

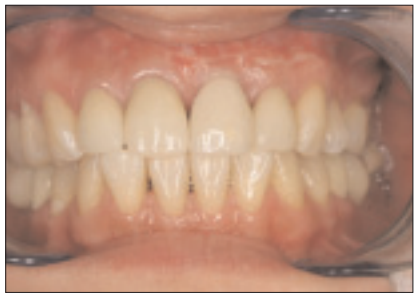

Figure 20: *Final crown (photo courtesy of Dr. Roy Andrassy).*

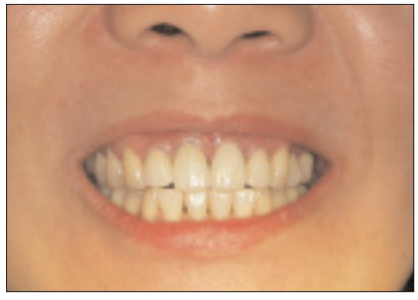

Figure 21: *Eight months after the procedure, the soft tissues are stable and healthy.*

removed (**Fig. 19**) to allow the surgeon to torque test the implant; the abutment and the temporary crown were then replaced with minimal insertion torque, and the patient was referred to the restorative dentist. The restorative dentist removed the temporary crown and abutment for the final fixture-level impression. The abutment and the temporary crown were re-inserted while the laboratory prepared the fixture analogue, final abutment and final crown.

The laboratory returned the final crown with a "new" final abutment and abutment screw. The restorative dentist removed the interim abutment and screw and returned these materials to the surgical office. The final abutment was seated to 35 Ncm torque with a new abutment screw. The access hole was filled, and the final crown cemented in place (**Fig. 20**).

At the 8-month postoperative follow-up, the soft tissue at the implant site was healthy, with normal 2–3 mm pocket depths and no change in gingival margin position (**Fig. 21**).

Immediate implant placement into extraction sockets using the NobelPerfect implant has been a beneficial and predictable procedure in our practice. However, the screw-retained temporary system provided with the NobelPerfect implant can result in compromised temporary esthetics in some cases. We have developed a novel technique using a cement-retained provisional crown. The case presented here provides an excellent example of a cement-retained alternative to the conventional screw-retained temporization system provided for the NobelPerfect implant. ◆

Dr. David French *is a periodontist in full-time private practice in Calgary, Alberta. He is the director of the Alberta Dental Implant Academy, a not-for-profit organization of specialists dedicated to providing education on implants to the public and the dental profession. Information on ADIA courses can be found at www.adia.ca.*

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The author has no declared financial interests in any company manufacturing the types of products mentioned in this article.