Clinical Showcase

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

Single-Tooth Implant Reconstruction in the Anterior Maxilla

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Everyone wants to "get into implants." "Just start with single teeth," they say. "Just screw in a post and slap on a crown, it's that simple." In truth, fabricating an implant crown in the esthetic zone can be a nightmare. Colour matching, hard and soft tissue management, concerns about root proximity, occlusal considerations such as a deep overbite or parafunctional habits are just some of the challenges practitioners face when preparing an implant in the anterior maxilla.

This article discusses 2 important prosthodontic issues relating to the placement of dental implants in the esthetic zone. Tissue management is paramount in achieving a good esthetic result when restoring the single-tooth implant. Tissue "training" helps to develop a proper emergence profile and natural tooth appearance. Far too frequently, dentists do not fabricate provisional crowns before insertion of the final prosthesis, which may result in compromised esthetics. As to the question of whether to choose a screw-retained restoration or a cement-retained restoration, soft-tissue position and occlusal considerations will often influence this decision.

Patient Presentation

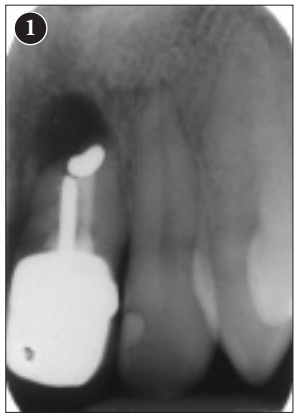
Our patient was a 39-year-old woman with a noncontributory medical history. She had a fractured post–core on a nonrestorable abutment (tooth 21), where endodontic treatment had failed. No buccal plate of bone was present due to pathologic changes.

The surgical phase of treatment included extraction, debridement and bone augmentation using bovine bone (Bio-Oss, OsteoHealth Co., Shirley, N.Y.) and a barrier membrane (Cytoplast Regentex TXT-200, Osteogenic Biomedical, Lubbock, Texas). An implant (Straumann ITI implant, Institut Straumann AG, Villeret, Switzerland) measuring 4.1 mm in diameter × 12 mm in height with an Esthetic Plus collar measuring 1.8 mm in height was surgically placed. The patient wore a partial denture (flipper) during the 6-month healing period.

Soft-Tissue Management

The crestal bone surrounding the dental implant must remain at the same level as the adjacent bone of the natural teeth after implant surgery. Soft tissues will collapse around the transmucosal healing collar. Tissue "training" with a provisional crown helps to re-establish normal gingival tissue contours and interdental papillae and to achieve adequate tooth emergence. The final impression must capture the "trained" soft tissue for successful restoration in the dental lab.

Figures 1 to 3: *Preoperative radiograph of apical lesion (**Fig. 1**). Surgical treatment included placement of a Straumann ITI implant (**Fig. 2**). Six months after surgery (**Fig. 3**), tissues appear collapsed around the healing collar.*



Before placement of the provisional crown, the head of a temporary titanium post was adapted and a temporary acrylic crown modified to re-establish the interdental papillae with normal tissue contours. Relining technique for the provisional crown included initial relining of an acrylic shell in the mouth followed by adaptation of the subgingival margins in the laboratory. This technique establishes a straight line emergence from the beveled margin of the post head and helps "train" the soft tissues.

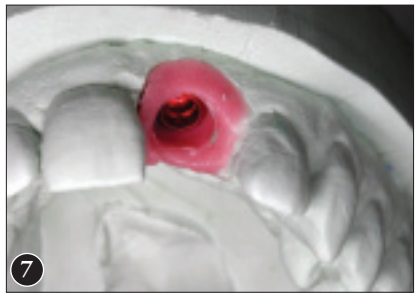
Figures 4 and 5a to 5e: *Modified head of temporary titanium post 3 weeks after insertion of the provisional crown (**Fig. 4**). Straumann titanium post head before adaptation (**Fig. 5a**). The modified post head was placed on an analog and adjusted in the lab (**Figs. 5b** to **5e**).*

Screw-Retained Restoration vs. Cement-Retained Restoration

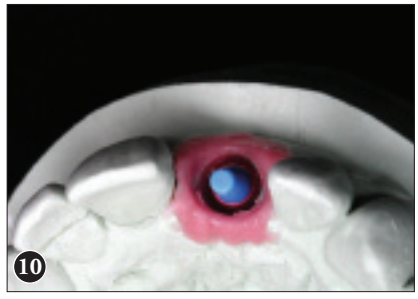
In the anterior maxilla, the palatal alveolar crest of bone is often 4 to 6 mm below the gingival tissue crest. With the bone levels this deep, cement is often entrapped deep subgingivally around implant abutments. Two treatment alternatives can help avoid this problem. One approach uses a screw-retained crown with a lingual set screw attached to a shorter implant abutment (e.g., TS abutment with transversal screw). Another approach uses a custom post head attached to a standard implant abutment. In the latter case, the crown margins of the post head are positioned just slightly below the gingival tissue crest, allowing the practitioner to cement a conventional crown with ideal tissue control.

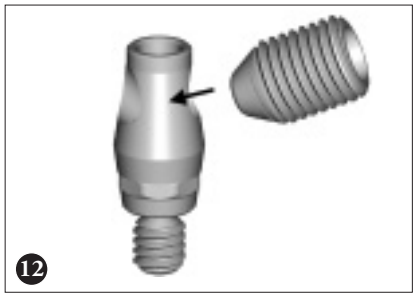
How does the lab technician decide which abutment to use? Will an angulated abutment, a solid cementable abutment or a screw-retained abutment be the best choice? A prosthetic planning kit with plastic abutments can help the dental technician and the dentist work together to plan the best treatment approach.

Figures 6 and 7: *Three weeks after the fabrication of the temporary crown, a final impression is made with polyvinyl siloxane using light and regular body material (**Fig. 6**). Master cast impression (**Fig. 7**) with soft tissue material around the implant. Note the deep subgingival position of the analog. Use of a cemented crown in this situation would likely result in entrapped dental cement.*



Figures 8 to 12: *Straumann Prosthetic Planning Kit (**Fig. 8**). A solid abutment (**Fig. 9**) is tried into the abutment analog (**Fig. 10**). Note how far subgingivally the finish line will be if a cementable abutment is used. A TS abutment (red plastic abutment) is tried into the abutment analog (**Fig. 11**). With this 4.4 mm-high abutment, a lingual set screw (**Fig. 12**) will allow retention of the anterior crown.*





Figures 13 to 16: *Single crown with lingual set screw retained to the TS abutment (**Fig. 13**). Periapical radiograph of the screw-retained final prosthesis taken on insertion day (**Fig. 14**). View of the porcelain-bonded-to-metal crown retained with the synOcta TS abutment one week after insertion (**Fig. 15**). Extraoral view of the finished restoration, one week after placement (**Fig. 16**).*

Surgical management of soft tissues and bone was paramount to the successful placement of a single crown on abutment tooth 21. Prosthetic treatment with a cemented restoration was not possible because of the deep subgingival location of the dental implant. Dental cement would likely become entrapped as a result. Prosthetic options for this patient included a screw-retained crown with a lingual set screw (the TS abutment) or a screw-retained custom post head (using a synOcta 1.5 mm abutment from Straumann) that raised the crown margin of the post to a level just subgingival to the crest of the gingival tissues. ◆

Acknowledgements: *The implant team for this case was Dr. Rubinoff, Dr. Howard Switzman (referring dentist), Dr. Ken Hershenfield (periodontist and implant surgeon), and Baluke Dental Studio (dental laboratory).*

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