PEER-REVIEWED

Implant Esthetics in an Immediate Restoration Protocol

Incorporating a one-piece ceramic implant design to manage compromised soft-tissue volume and quality

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In the esthetic zone, when replacing a maxillary central incisor for a patient who has a high smile line at the gingival zenith, it is critically important to manage any compromised soft tissue regarding biotype, volume, and thickness. Patients who present with a thin gingival biotype or who otherwise exhibit poor volume and thickness of the facial gingival tissues are at an increased risk of soft-tissue complications from dental implant surgery.

Incorporating metal-free dental implants into protocols for patients with compromised gingival tissues who require tooth replacement, especially in the esthetic zone, can not only improve the esthetics of the restorations but also help to avoid or reduce the occurrence of soft-tissue complications. In addition, two-piece titanium dental implant designs can create subgingival areas at the connection where plaque biofilm can form, potentially resulting in additional concerns for these patients. Therefore, the selection of a one-piece zirconia dental implant design that allows for alteration of the abutment, the collar, and even the implant portion can offer an added level of safety in these compromised implant sites.

A 32-year-old female patient presented for treatment of an endodontically failed left maxillary central incisor. She demonstrated a high lip line when she smiled, a thin gingival biotype, a compromised band of attached soft tissue, and marginal inflammation in the area of the papillary tissues between her maxillary central incisors. Management of this site with a conservative surgical and immediate restoration protocol was essential not only to the success of the implant procedure but also, more importantly from the patient's perspective, to the success of the esthetics. After consulting with the patient and reviewing the pros and cons of a titanium dental implant design when compared with a metal-free dental implant option, the patient opted for a metal-free, one-piece implant design to treat this critical area. Long-term success in cases such as these can also be favorably influenced by the use of a one-piece design because it eliminates the issues associated with the microgap at the junction of the implant/abutment complex in titanium implants and allows for the hemidesmosomal seal that forms between the soft tissues and the implant/abutment complex to remain unaltered.

"Management of this site with a conservative surgical and immediate restoration protocol was essential..."

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FIG. 1


FIG. 2

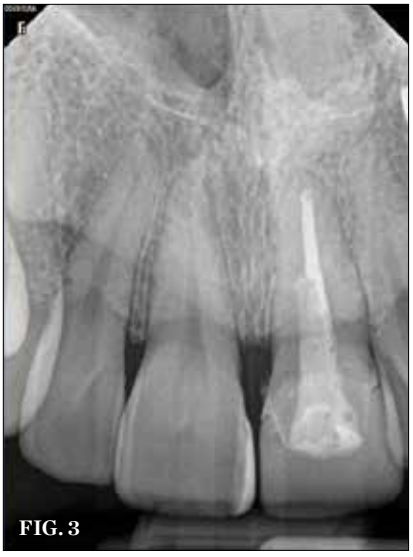
FIG. 3

(1.) Pretreatment retracted clinical view with teeth in maximum intercuspation. **(2.)** Pretreatment retracted maxillary facial view demonstrating compromised soft tissue biotype and marginal inflammation. **(3.)** Pretreatment digital periapical radiograph of the endodontically failed maxillary left central incisor.


FIG. 4


FIG. 5


FIG. 6


FIG. 7

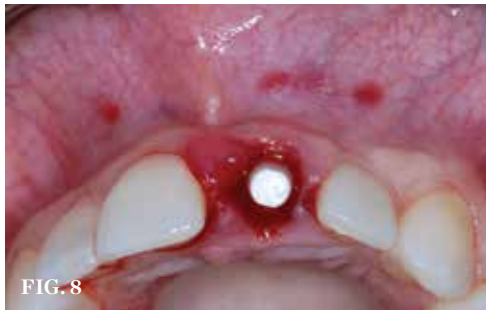
FIG. 8


FIG. 9

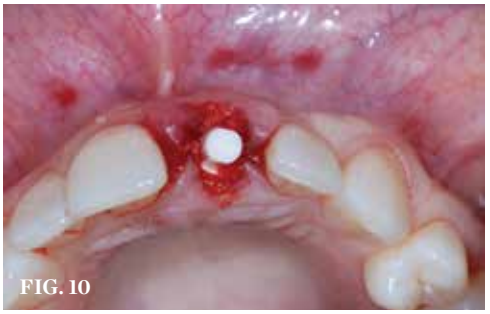
FIG. 10


FIG. 11


FIG. 12


FIG. 13


FIG. 14


FIG. 15


FIG. 16

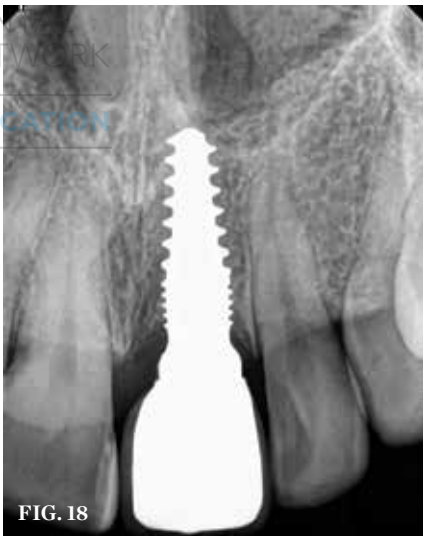
FIG. 18


FIG. 19


FIG. 17

(4.) Retracted maxillary facial view following atraumatic removal of the maxillary left central incisor. Note that the soft-tissue contours were preserved. **(5.)** Maxillary occlusal view of the extraction site after mechanical and rotary instrument debridement showing buccal-palatal width. Care must be given to the spatial placement of the one-piece zirconia implant. **(6.)** Maxillary occlusal view of the osteotomy site preparation, which was initially created with a 2.3-mm all-ceramic twist drill and then subsequently widened into a 3.75-mm apically prepared osteotomy site. **(7.)** Retracted maxillary facial view following minimally invasive placement of a one-piece tapered 4.0 mm x 12 mm zirconia implant (Z5m(t), Z Systems USA Inc.) to an initial torque index of 50 Ncm. **(8.)** Occlusal view of the maxillary left central implant site exhibiting a buccal void between the implant surface and the residual buccal plate and soft tissues. **(9.)** A graft complex incorporating a bioactive polycrystalline bone graft substitute (Osseolive®, Curasan Inc.) and autologous platelet-rich fibrin was prepared for minimally invasive placement. **(10.)** Graft complex placed buccal to the implant fixture using a minimally invasive light condensation protocol. **(11.)** Contoured provisional restoration made by retrofitting the preexisting all-ceramic restoration. Marginal integrity of the provisional was completed extraorally utilizing an implant/abutment replica. **(12.)** Immediate postoperative clinical view of the provisional restoration seated with temporary cement (ETC™ Easy Temporary Cement, Parkell, Inc.). **(13.)** Immediate postoperative retracted view with teeth in maximum intercuspation. **(14.)** Immediate postoperative CBCT scan cross-sectional view of the implant-retained provisional restoration. **(15.)** Postoperative retracted clinical view of the final implant-retained crown (IPS e.max®, Ivoclar Vivadent) with teeth in maximum intercuspation. The final restoration was cemented (RelyX™ Unicem 2, 3M) 5 months after the initial surgical procedure. **(16.)** Postoperative retracted close-up right lateral view of the final implant-retained crown exhibiting natural facial gingival tissues and profile. **(17.)** Postoperative close-up maxillary facial view of the final restoration. **(18.)** Postoperative digital periapical radiograph of the final restoration. **(19.)** Postoperative CBCT scan cross-sectional view of the final restoration.