

Clinical Management of Type 3 Recession Defects With Immediate Implant and Provisional Restoration Therapy: A Case Report

Dennis P. Tarnow, DDS; and Stephen J. Chu, DMD, MSD, CDT

Abstract: Type 3 extraction sockets present a unique challenge in that they possess gingival recession indicative of facial hard- and soft-tissue loss. When teeth present with prior disease requiring removal and implant replacement, the treatment strategy incorporates palatal implant positioning as well as proper restorative contour management to compensate for the recession defect, thereby allowing the gingival tissues to heal in the correct 3-dimensional position. This article describes the case of a patient with a nonrestorable maxillary right central incisor with internal resorption. The case demonstrates the use of immediate implant and provisional restoration therapy in type 3 (recession) clinical situations.

Several extraction socket classifications have been published in the dental literature; however, a simple treatment approach for maxillary anterior teeth was reported in 2007 that categorized whether the labial bone plate and associated soft tissues were present or absent.¹ According to this classification system, type 1 sockets were identified as intact; all the hard and soft tissues were present. Type 2 sockets were identified as having the soft tissue present, but part of the labial bone plate was absent, indicative of a dentoalveolar dehiscence defect. Type 3 sockets were classified as having midfacial recession where portions of the soft and hard tissues were absent. This classification system served to distinguish esthetic risk for gingival recession in treatment of single-tooth implant sites in the esthetic zone. Other extraction socket classifications have been published incorporating loss of interdental tissue, which is a separate clinical scenario.²

Treatment of Types 1, 2, or 3 Sockets

The treatment of type 1, or intact, extraction sockets with immediate tooth replacement therapy has shown consistent outcomes in regard to implant survival, osseointegration, and esthetics since its introduction to implant dentistry in 1998.³⁻¹⁰ Implant position and diameter are critical factors to maintaining buccal gap distance for the potential of new labial plate formation.⁷ Hard-tissue grafting in conjunction with immediate implant therapy and provisional

restoration is important for avoiding gingival recession and buccal ridge collapse and enabling positive esthetic outcomes.^{5,8-10}

Type 2 clinical situations present greater challenges in treatment because there is partial or complete absence of the labial bone plate.¹¹ Type 2 sockets should be approached cautiously because the risk of midfacial recession is always present, especially in the esthetic zone. The size and extent of the pre-existing defect are defining factors in clinical and esthetic success.¹² Several authors have proposed clinical techniques to regenerate dehiscence defects, seen on radiographic examination, using various graft techniques and materials, with or without barrier membranes; however, they all have advocated and employed a flapless surgical approach.¹³⁻¹⁵ The key clinical determinants to achieve a predictable outcome are implant primary stability and graft containment with a provisional crown or custom healing abutment in non-occlusion.¹⁴

Type 3 extraction sockets present a different challenge because they already possess gingival recession indicative of facial hard- and soft-tissue loss. Gingival recession is often associated with a thin periodontal phenotype, cervical abrasion or erosion, or tooth malposition. Historically, facial overcontour of a restoration was typically associated with gingival recession.^{16,17} Excessive labial tooth position is also frequently the cause of recession and can be addressed by altering tooth position through orthodontic therapy. However, when teeth present with prior disease requiring removal and implant replacement, the treatment strategy incorporates palatal implant

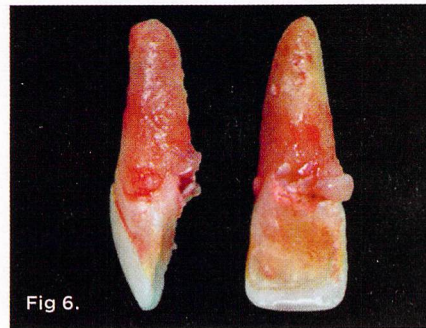
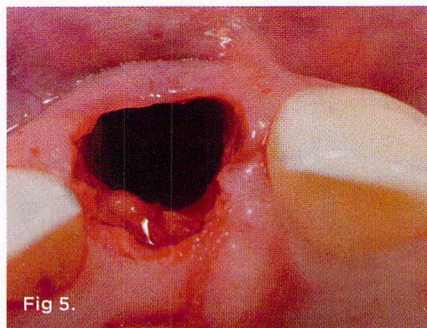


Fig 1. Preoperative extraoral view of tooth No. 8 in labial malposition with midfacial gingiva recession relative to adjacent teeth. **Fig 2.** Patient presented with a low smile line that did not expose the recession defect from an esthetic perspective. However, she was dissatisfied with the discrepancy in tooth and incisal edge position. **Fig 3.** The labial malposition of tooth No. 8 was apparent from the occlusal incisal view. The fact that the tooth was malpositioned allowed the strategy of palatal implant positioning within the dental arch and restorative undercontouring to correct the gingival profile and free gingival margin location. **Fig 4.** Periapical radiograph showed internal resorption of tooth No. 8 and possible ankylosis of the root. **Fig 5.** Tooth No. 8 was carefully excised in a flapless surgical approach. **Fig 6.** The removed tooth showed the internal resorption lesion had perforated the palatal aspect of the root.

positioning as well as proper restorative contour management to compensate for the recession defect, thereby allowing the gingival tissues to heal in the correct 3-dimensional position.^{18,19}

The following report describes the case of a patient with a nonrestorable maxillary right central incisor tooth with internal resorption.

Case Report Discussion

A 26-year-old woman presented with existing veneer restorations on teeth Nos. 7 through 10, with tooth No. 8 in a more apical position relative to the adjacent dentition (Figure 1). Although the patient had a low midfacial smile line, she was concerned about the incisal edge discrepancy and the negative gingival architecture due to tooth malposition in both vertical and buccolingual directions (Figure 2). Prior dental history embraced the use of orthodontic treatment to reposition tooth No. 8 into the dental arch; however, this treatment proved futile because the tooth may have been ankylosed from trauma (Figure 3). Radiographic examination of tooth No. 8 revealed internal root resorption (Figure 4).

The tooth was removed very carefully in a minimally invasive, atraumatic, flapless manner (Figure 5). Upon removal of the tooth, the resorption lesion was evident on the palatal aspect (Figure 6). The vertical implant depth was placed relative to the midfacial crest of bone, roughly 3 mm from the free gingival margin (Figure 7). In

addition, the implant was placed in a palatal position—where the existing and correct tooth position should have been—to manage the proper restorative contour of the provisional restoration.

The diagnostic key in the predictable treatment of a type 3 recession defect is the height of the palatal tissues,²⁰ which in this case were in a coronal position and consistent with the adjacent interdental tissues (Figure 8). An acrylic gingival sleeve, or shell, was fabricated and milled from a prefabricated polymethylmethacrylate block using a CAD/CAM digital file.²¹ This sleeve was then luted to a prefabricated implant abutment post using an autopolymerizing acrylic resin (Super-T, American Consolidated Manufacturing) to create a screw-retained provisional restoration (Figure 9). Proper contour and spatial gingival undercontour were created in the provisional restoration to allow the facial gingival margin to migrate to a more incisal position (Figure 10).

After provisional restoration fabrication and its removal, a tall, flat-contoured titanium healing abutment was connected to the implant to allow a small-particle mineralized cancellous bone allograft material (Puros[®], Zimmer Biomet, zimmerbiometdental.com) to be placed into the facial gap. The dual-zone technique was used to graft not only the bone zone (palatal to the labial bone plate), but also the soft-tissue zone (peri-implant soft tissues) (Figure 11).⁸

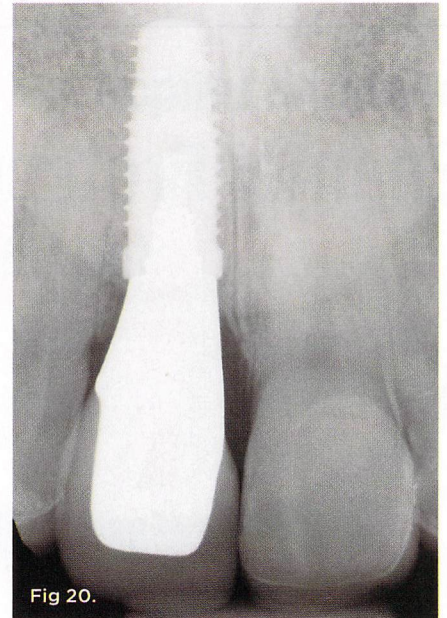
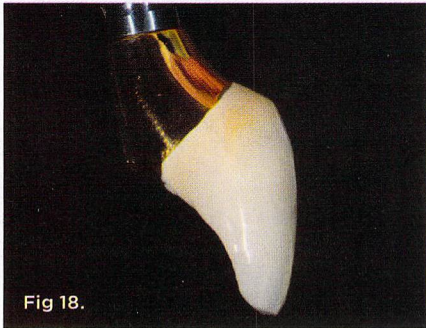
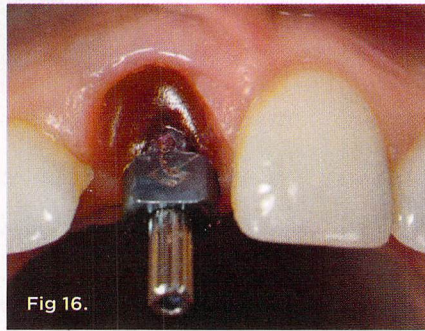
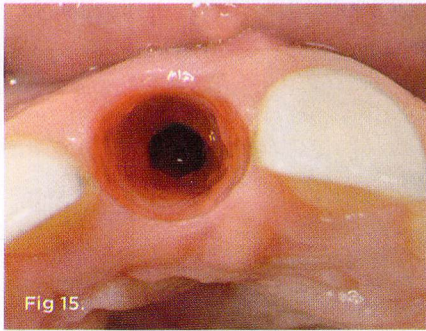


Fig 15. First provisional restoration disconnection showed the corrected facial ridge dimension and profile mimicking that of the adjacent central incisor tooth No. 9. Through proper implant positioning and restorative subgingival contour, the recession defect was corrected. **Fig 16.** An implant-level impression transfer coping was seated and pattern resin used to register the soft-tissue profile of the peri-implant soft tissues as well as the ridge dimension and shape. **Fig 17.** A metal-ceramic crown was fabricated on the soft-tissue gypsum cast. **Fig 18.** The screw-retained metal-ceramic noble alloy crown was gold-plated to improve the color tone of the peri-implant soft tissues. **Fig 19.** Intraoral view of the inserted definitive crown in maximum intercuspal position. The level of the free gingival margin was corrected equivalent to and harmonious with the adjacent dentition. **Fig 20.** Periapical radiograph of the definitive restoration exhibiting adequate bone levels around the immediate implant.

placed onto the implant-level impression coping, and a gypsum soft-tissue hybrid master cast was created to allow laboratory fabrication of a screw-retained definitive restoration.

Metal-ceramic was selected as the definitive material of choice due to its optimal strength and esthetics with regard to the final screw-retained restoration (Figure 17).²² This material allowed proper subgingival contouring while maintaining maximum strength of the restoration with a platform-switched design. Gold plating the noble metal alloy also enhanced the esthetic outcome with respect to gingival color tone (Figure 18).²³ The final screw-retained restoration was inserted according to the manufacturer's recommendation of screw preload.

One year after surgery, the tissue contour and gingival tone of the implant restoration of tooth No. 8 integrated well with the adjacent teeth (Figure 19). Additionally, periapical radiography showed positive bone levels (Figure 20).

Conclusion

The use of immediate implant and provisional restoration therapy in type 3 (recession) clinical situations can result in predictable esthetic outcomes. The diagnostic keys for success are: (1) pre-existing labial tooth malposition; (2) flapless tooth removal with the palatal tissues at the proper height; (3) palatal implant placement; (4) dual-zone

bone grafting; (5) provisional restoration placement in non-occlusal function; and (6) proper tissue healing for 4 to 6 months.

ABOUT THE AUTHORS

Dennis P. Tarnow, DDS

Clinical Professor, Director of Implant Education, Columbia University College of Dental Medicine, New York, New York

Stephen J. Chu, DMD, MSD, CDT

Adjunct Clinical Professor, Ashman Department of Periodontology and Implant Dentistry, Department of Prosthodontics, New York University College of Dentistry, New York, New York

REFERENCES

1. Elian N, Cho SC, Froum S, et al. A simplified socket classification and repair technique. *Pract Proced Aesthet Dent.* 2007;19(2):99-104.
2. Funato A, Salama H, Ishikawa T, et al. Timing, positioning, and sequential staging in esthetic implant therapy: a four-dimensional perspective. *Int J Periodontics Restorative Dent.* 2007;27(4):313-323.
3. Wohrle PS. Single-tooth replacement in the aesthetic zone with immediate provisionalization: fourteen consecutive case reports. *Pract Periodontics Aesthet Dent.* 1998;10(9):1107-1114.
4. Kan JY, Rungcharassaeng K, Lozada J. Immediate placement and provisionalization of maxillary anterior single implants: 1-year prospective

study. *Int J Oral Maxillofac Implants*. 2003;18(1):31-39.

5. Block MS, Mercante DE, Lirette D, et al. Prospective evaluation of immediate and delayed provisional single tooth restorations. *J Oral Maxillofac Surg*. 2009;67(11 suppl):89-107.

6. El-Chaar ES. Immediate placement and provisionalization of implant-supported, single-tooth restorations: a retrospective study. *Int J Periodontics Restorative Dent*. 2011;31(4):409-419.

7. Tarnow DP, Chu SJ. Human histologic verification of osseointegration of an immediate implant placed into a fresh extraction socket with excessive gap distance without primary flap closure, graft, or membrane: a case report. *Int J Periodontics Restorative Dent*. 2011;31(5):515-521.

8. Chu SJ, Salama MA, Salama H, et al. The dual-zone therapeutic concept of managing immediate implant placement and provisional restoration in anterior extraction sockets. *Compend Contin Educ Dent*. 2012;33(7):524-534.

9. Tarnow DP, Chu SJ, Salama MA, et al. Flapless postextraction socket implant placement in the esthetic zone: part 1. The effect of bone grafting and/or provisional restoration on facial-palatal ridge dimensional change - a retrospective cohort study. *Int J Periodontics Restorative Dent*. 2014;34(3):323-331.

10. Chu SJ, Salama MA, Garber DA, et al. Flapless postextraction socket implant placement: part 2. The effect of bone grafting and/or provisional restoration on peri-implant mucosal tissue height and thickness - a retrospective study. *Int J Periodontics Restorative Dent*. 2015;35(6):1-10.

11. Chu SJ, Sarnachiaro GO, Hochman MH, Tarnow DP. Subclassification and clinical management of extraction sockets with labial dentoalveolar dehiscence defects. *Compend Contin Educ Dent*. 2015;36(7):516-525.

12. Kan JY, Rungcharassaeng K, Sclar A, Lozada JL. Effects of the facial osseous defect morphology on gingival dynamics after immediate tooth replacement and guided bone regeneration: 1-year results. *J Oral Maxillofac Surg*. 2007;65(7 suppl 1):13-19.

13. da Rosa JC, Rosa AC, da Rosa DM, Zardo CM. Immediate dentoalveolar restoration of compromised sockets: a novel technique. *Eur J Esthet Dent*. 2013;8(3):432-443.

14. Sarnachiaro GO, Chu SJ, Sarnachiaro E, et al. Immediate implant placement into extraction sockets with labial plate dehiscence defects: a clinical case series. *Clin Implant Dent Relat Res*. 2016;18(4):821-829.

15. Tripodakis AP, Gousias H, Mastoris M, Likouresis D. Five-year volumetric evaluation of periodontally compromised sites restored by immediate implant restorations. *Int J Periodontics Restorative Dent*. 2016;36(5):645-653.

16. Weisgold AS. Contours of the full crown restoration. *Alpha Omegan*. 1977;70(3):77-89.

17. Su H, Gonzalez-Martin O, Weisgold AS, Lee E. Considerations of implant abutment and crown contour: critical contour and subcritical contour. *Int J Periodontics Restorative Dent*. 2010;30(4):335-343.

18. Chen ST, Buser D. Clinical and esthetic outcomes of implants placed in postextraction sites. *Int J Oral Maxillofac Implants*. 2009;24(suppl):186-217.

19. Steigmann M, Monje A, Chan HL, Wang HL. Emergence profile design based on implant position in the esthetic zone. *Int J Periodontics Restorative Dent*. 2014;34(4):559-563.

20. Gargiulo AW, Wentz FM, Orban B. Dimensions of the dentogingival junction in humans. *J Periodontol*. 1961;32(3):261-267.

21. Chu SJ, Hochman MN, Tan-Chu JH, et al. A novel prosthetic device and method for guided tissue preservation of immediate postextraction socket implants. *Int J Periodontics Restorative Dent*. 2014;34(suppl 3):s9-s17.

22. Gallucci GO, Grütter L, Nedir R, et al. Esthetic outcomes with porcelain-fused-to-ceramic and all-ceramic single-implant crowns: a randomized clinical trial. *Clin Oral Implants Res*. 2011;22(1):62-69.

23. Ishikawa-Nagai S, Da Silva JD, Weber HP, Park SE. Optical phenomenon of peri-implant soft tissue. Part II. Preferred implant neck color to improve soft tissue esthetics. *Clin Oral Implants Res*. 2007;18(5):575-580.



Dentatus NARROW DIAMETER IMPLANTS: Tested. Validated.

Dentatus Implants have overwhelming publication and clinical reference substantiating long-term success. Since the introduction of their narrow diameter implant in the late 1980s, Dentatus has led the way in laying the ground work collaborating with clinical experts to develop Dentatus ANEW® and Atlas® Implant Systems.

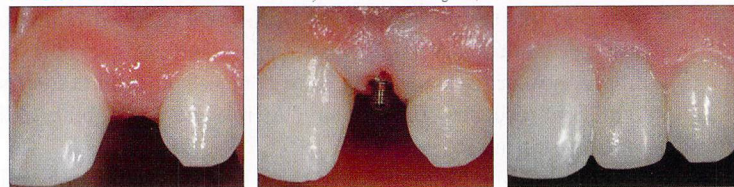
As best explained by Dr. Dennis Tarnow, "The bone does not know the difference between a 1mm implant or a 9mm implant. What matters is what you do on top of it." Only Dentatus offers a screw-retained narrow diameter implant system that can grow with you: from overdentures, to single tooth, to full mouth reconstruction.

Whether you place implants yourself or refer them, Dentatus ANEW offers the versatility to ensure that your patients can benefit from the treatment they deserve.

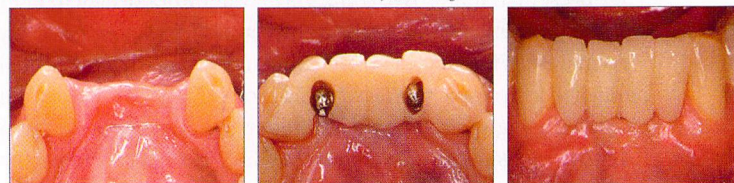


© 2017 Dentatus USA, Ltd.

MISSING LATERALS courtesy Dr. Paul Petrunaro, 2004



THIN RIDGES & DEFECTS courtesy Dr. Sang-Choon Cho, 2002



OVERDENTURES courtesy Dr. Mark Iacobelli, 2010

