Use of Custom Anatomic Healing Abutments: A Case Report

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Abstract

Objective: The focus of implant success criteria has shifted from implant survival to the creation of life-like implant restorations with natural-looking peri-implant soft tissues. As part of this treatment process, the use of customized healing abutments has been implemented with the purpose of contouring the soft tissues and creating a natural emergence profile that would allow for an esthetic and functional implant restoration.

Material and Methods: A 47-year-old healthy female patient presented to the University of East Carolina School of Dental Medicine clinic for implant replacement to replace tooth #5. A maxillary CBCT was exposed and an intraoral scan was obtained with Cerec Omnicam®. Data was imported into CoDiagnostix® software for planning and guide design. The customized healing abutment was designed and manufactured with PMMA on a titanium base abutment. Implant placement was completed using a fully guided protocol and a customized healing abutment was placed. Tissues healed well and the implant was restored with a ceramic crown.

Results: The implant was placed in a restoratively driven position with a customized healing abutment that allowed for creation of an emergence profile through guided soft tissue healing from the day of implant surgery. Also, the custom healing abutment allowed for maintenance and support of the tissue for ideal restorative contours.

Conclusion: The use of customized healing abutments allows the clinician to guide the soft tissue healing to facilitate the prosthetic procedures and obtain a restoration with adequate tissue contours and esthetics.

Case History

A 47-year-old healthy patient presented to East Carolina University faculty practice clinic for comprehensive treatment. She presented with missing tooth #5 due to caries and her chief complaint was to replace her missing tooth with something fixed and esthetically pleasing (Figures 1, 2). After discussing different options, the selected treatment plan consisted of guided dental implant placement at site #5 with a customized healing abutment and delivery of a screw-retained ceramic crown.

An intraoral digital scan was obtained using an intraoral scanner (Cerec Omnicam®; Dentalply Sirona). A cone beam computed tomography (CBCT) was exposed (Orthosoft XG; Sirona Dental Systems Inc.) to assess the present bone volume and density. Implant placement was planned utilizing an implant planning software (CoDiagnostix®; Dental Wings) in order to determine the ideal prosthetically driven position for implant body placement. A tooth supported implant placement guide was designed with the same software. The surgical guide was then produced using a 3D printer (Formlab 2; Formlabs Inc.) in order to increase predictability and precision of implant placement, as well as reduce surgical time. A customized healing abutment recreating the ideal emergence profile and tooth anatomy was manufactured with PMMA on a titanium Vanobase abutment (Straumann®) (Figure 3).

Using local anesthesia, a full thickness flap was elevated. The tooth supported surgical guide was placed and verified that it was fully seated through the verification windows (Figure 4). Using a one-stage approach, delivery of a 3.3mm x 10 mm BLT SLActive implant (Straumann®) was completed using the appropriate proposed sequence for computer-guided implant placement to a torque of 35Nm (Figures 5, 6). There were no fenestration or dehiscence however, there was a minor concavity on the buccal aspect of the ridge. To compensate for this slight volume deficiency, an osseofying membrane (Ossix®; Volumax, Datum) was placed and sutured to the peristium (Figure 7). The customized healing abutment was then placed. Tissues were adapted and sutured using 5-0 Glycolon suture (Resorbab®; Osteogenics) (Figures 8, 9).

Implant integration was confirmed at 7-weeks post-operatively and a periapical image was exposed (Figures 10, 11). A customized implant level impression was obtained using an open tray technique (Straumann®) (Figure 12). This technique was utilized in order to capture the emergence profile obtained by the customized healing abutment and to transfer it to the master cast to fabricate a Restoration with ideal contours. A screw-retained monolithic Zirconia crown was delivered 12-weeks after implant placement. Tissues appeared healthy and the emergence profile was maintained throughout the healing and osseointegration phase (Figures 13, 14). The patient was pleased with the treatment both functionally and esthetically.

Discussion

Traditional standard healing abutments have a circular profile that does not mimic the emergence profile of a natural tooth. Due to this limitation, standard abutments are unable to support the supracrestal soft tissues, and this will result in a profile that is not in accordance with the contours of the definitive implant restoration. Customized healing abutments manufactured by direct analog methods or CAD/CAM technology has been utilized in implant dentistry to create the emergence profile through guided soft tissue healing from the day of implant surgery to allow local anatomy during the osseointegration phase; maintain the ideal emergence profile for optimal final restorative contours; and allow for straightforward access during the restorative phase.

The majority of literature on customized healing abutments is limited to case reports and case series. Furthermore, their use has been mainly documented in the esthetic area or during immediate implant placement with the purpose of containing bone grafting material. Within this current case report, customized healing abutments in the posterior region have demonstrated an ability to provide stability to the soft tissues and to create an environment conducive to seating and maintenance of a definitive restoration. Our group is conducting further research to better understand the long-terms effects of customized CAD/CAM healing abutments on peri-implant health, soft and hard tissue stability and patient-related outcomes in the posterior region.

Conclusions

Customized healing abutments are an alternative option for the use of abutment placement post-implant insertion. This type of abutment is beneficial to supporting supracrestal tissues and allowing for a better emergence profile suitable for crown placement. This can facilitate the restorative steps and delivery of a crown that appropriately seats and allows for a more natural and cleanable restoration with good esthetics.

References