Inconspicuous anterior implant-supported restorations: Combining clinical and laboratory expertise

By Dr. Larry R. Holt, USA

The ultimate goal of tooth replacement in the esthetic zone is an inconspicuous transition from dental restoration to the patient’s natural, biologic tissues. This transition is evaluated at many levels. Color and contour of gingiva at the interface must mimic the natural contours and color of adjacent and contralateral teeth.

The dental restoration must match contour and blend seamlessly into the existing dentition. Color matching of final crown must be consistent with existing dentition (hue, chroma and value). This case study explores the management and correction of a previously treated implant retained maxillary central incisor.

The patient presented as a healthy, 48-year-old female with no contributory health history to prohibit dental treatment. Recent dental history revealed an Ankylos implant to replace tooth 79 had been placed approximately five months prior to this visit. The implant had been uncovered and a temporary abutment was placed.

A ridge lap provisional restoration was fabricated to fit the coronal portion of the abutment. The resultant provisional was not only unsesthetic but also was the source of considerable tissue inflammation and patient discomfort (Figs. 1-3). Patient reported dissatisfaction with the provisional treatment and was seeking a more desirable solution.

Clinical evaluation revealed a well-placed implant with acceptable position both facio-lingually and mesiodistally. Additionally, there was good volume of soft tissue and ridge form was ideal. Surgeon reported that the implant was well-integrated in bone. There was a poorly adapted provisional restoration over an inadequately contoured provisional abutment. Radiograph revealed excessive acrylic that extended well into the dental sulcus all the way to the implant platform (Fig. 4). This acrylic did not provide any emergence profile support of transmucosal tissue.

The provisional restoration was poorly adapted to both the abutment and to the ridge crest soft tissue. Intaglio surface was rough and made in such a manner as to create a ridge lap profile. The facial and proximal surfaces of the provisional were fitted over soft-tissue crest. There had been no attempt to modify gingival tissue emergence profile or to create the environment for inconspicuous transition from restoration to biologic tissues.

Techniques for managing emergence profile are well-documented in the literature. Interproximal tissues will point and form papillae when appropriate lateral pressure is applied with a temporary abutment. When natural teeth are on either side of the implant. The adjacent bone height will dictate the level of the papillae assuming the restoration and its associated abutment properly support them. Facial contour can be manufactured to create appropriate gingival zenith height by increasing or decreasing facial emergence profile. Increasing the profile will move the gingival zenith apically and reductive contour will move the crest incisally.

Treatment plan consisted of removal of temporary abutment/provisional crown, fabrication of a temporary partial denture (Figs. 5, 6) and placement of an appropriate temporary abutment that did not retain a provisional crown (Ankylos sulcus former) (Fig. 7).

This sulcus former, as its name implies, would provide soft tissue emergence profile support. The partial denture was to be placed to avoid interference with the sulcus former when fully seated (Fig. 8). Patient was to be recalled in one-week intervals to evaluate the response to this treatment. Once healed, a final, customized abutment and cementable all-ceramic crown would be delivered.

The plan was followed per previous description. Postoperative visits were uneventful. Patient comfort was immediate. Tissue health and emergence profile were deemed appropriate at the second week recall visit (Figs. 9-10).

At a subsequent appointment, the sulcus forming abutment was removed, a closed tray impression coping was placed and an impression (Identium, Kettenbach) was taken for fabrication of final restoration (Figs. 11, 12). Appropriate coping, a custom bite registration and facebow accompanied the case to the laboratory. A careful shade map and clinical photography were included.

Clinically, it was determined that this would be a difficult shade because of surface characteristics and maverick colors of the adjacent central incisor. Arrangements were made to have a laboratory technician available at the delivery appointment. Sulcus former and temporary partial were reinserted and patient was dismissed and scheduled for delivery appointment.

All model work was accomplished. The laboratory was given the option of fabricating a custom abutment or customizing a stock abutment. This decision was to be based on the trajectory of the abutment relative to the position of the implant. The placement of the implant was ideal and the use of a lab-modified, stock abutment was selected (5 degree Cercon Balance Abutment, Dentistry Implant).

The contour correlation between the sulcus former and the emergence profile of the stock abutment complement one another. The margins were placed 1 mm subgingivally on facial, mesial and distal. The lingual margin was placed at 5 mm.

Once the abutment was perfected, an all-ceramic crown was fabricated (eMax, Ivoclar). The crown was waxed to full contour, and then the facial was cut back to provide a field into which a customized facial surface could be developed from added porcelain. The wax pattern was invested and pressed. The resultant crown was then modified with additional application of porcelain and was left preglazed in anticipation of chairside staining (Figs. 13, 14).
The delivery appointment was un-
eventful. The lab provided a seating
jig that simplified the positioning of the cus-
tioned abutment (Fig. 18). The abutment
was torqued to man-
ufacture's specifications (Figs. 16, 17).
The crown was tried in and adjust-
ments were made to proximal contacts and to occlusion. A dental labora-
tory technician was enlisted to provide
customized crown fabrication to per-
fect the color match. Both patient and
clinicians were satisfied with the result-
ated crown/abutment interface. Fur-
thermore, it must allow for adequate
crown thickness to have appropriate
strength to withstand mastication
forces and still remain retentive. The
final contours of the crown could be
managed in such a way as to blend
to the existing dentition.

This patient did not have a symmet-
ral arch form. The lateral incisors
were the incisal edges consistent. Finally, the color match of the res-
toration, especially a central incisor,
must be as identical as possible to
the existing dentition. None of these
parameters can be accomplished with
precise communication and excellent
laboratory work.

This case was a success based upon
all previously described parameters. The
gingival contour was essentially
mirror image identical to the adja-
cent central incisor. Papillae were
intact.12 The laboratory was skil-
lful in modification of the abutment so
that the margins were concealed
within the sulcus. The axial and in-
cisal contours of the abutment pro-
vided adequate clearance so that a
proper thickness crown could be
developed.

It is critical for both esthetics and
for long term strength and stabili-
ty of the definitive restoration. The
technician selected the appropriate
ingot of ceramic material to serve as
substrate for the subsequent applica-
tion of modifying porcelains and sur-
face finishing. Final color matching
could not have been accomplished
without skilled hands and eyes of a
technician at chairside.

Close communication and strong
laboratory relationships, along with
appropriate clinical understanding of
test-tissue management, leads
to success. The inconspicuous final
case of this patient could never have
been accomplished without strong
support from the dental laboratory.

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