

Maximizing Implant Esthetics With Minimal Interdental Space

Nelson Y. Howard, D.D.S.

Dental implants have been in use now for many years. The successful results we are able to achieve today versus even five to ten years ago has dramatically increased. Marked improvements in technology and implant design have enabled the clinician to achieve excellent results in otherwise difficult situations. Knowledge of the various implant systems available and how they will affect each individual case plays a large part in the final outcome for the patient. Prior to beginning treatment, of utmost importance is the careful analysis of the patient's condition and all the factors influencing the end result. In order to accurately assess the proper treatment and

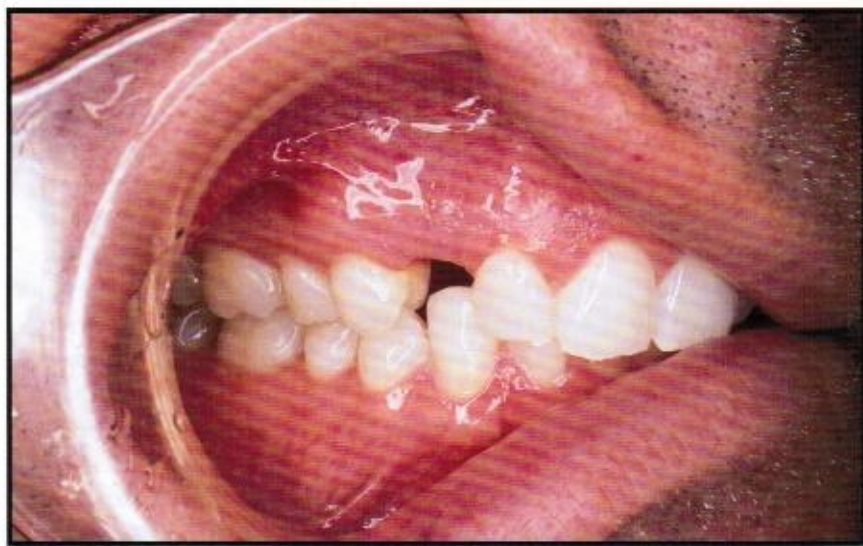


Figure 1

Marked improvements in technology and implant design have enabled the clinician to achieve excellent results in otherwise difficult situations.

implant selection, a comprehensive pre-treatment work-up is absolutely necessary and should include a thorough dental and periodontal examination, complete radiographs, study models, diagnostic wax-ups, and an analysis of the patient's occlusion. When all these factors have been evaluated, the final result can be very rewarding.

Case Study

The following case is an illustration of a compromised interdental space problem. The patient, a 44 year-old male, initially presented with a palatally impacted

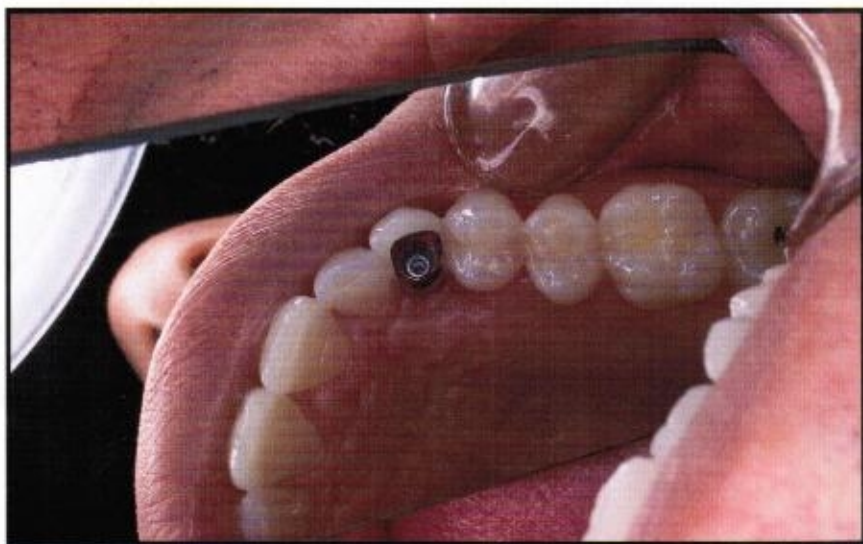


Figure 2

maxillary right cuspid with a severely attritioned retained deciduous cuspid (#C) in buccoversion. The patient's opposing mandibular right cuspid presented with extensive supereruption lingual to #C in direct mesiodistal and buccolingual alignment between teeth #5 and #7. A direct composite veneer was initially placed on #C in an attempt to esthetically duplicate the appearance of tooth #11. Over time due to heavy lateral excursive movements, the veneer was unable to withstand the laterotrusive forces placed upon it and fractured, along with the distoincisor edge of #C. The decision was made to extract #C along with the palatally impacted maxillary right cuspid and place a single tooth implant. At the time of the initial photographs (Figure 1), the retained cuspid #C along with the impacted maxillary right cuspid had been extracted.

Treatment Options

Prior to the extraction of teeth #C and #G, the determination was made to place a single tooth dental implant and crown due to:

1. The inability to restore the space with either a conventional three-unit bridge or any type of bonded bridge as a result of: a. the extreme

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supereruption of tooth #27 into the interdental space between teeth # 5 and #7; b. the compromised pontic design in a three-unit bridge with the opposing tooth #27; c. heavy laterotrusive forces creating exces-



Figure 3

- sive stress on pontic tooth #G as well as in teeth #5 and #7.
2. The patient's desire not to alter either tooth #5 or #7 or to have orthodontic treatment.

After a thorough evaluation and analysis of the patient's limited interdental space (5.5mm from the mesial of tooth #5 to the distal of tooth #7), the decision was made to place a 3.3mm diameter, 13mm length 3i internal hexagonal head implant three months after the initial surgery. The subsequent implant restoration would be a UCLA-type abutment. By placing a single tooth implant and crown along with sufficient facial and incisal enameloplasty on tooth #27 (to allow for adequate lingual clearance of the restoration), the patient's desire not to involve the adjacent teeth would be achieved.

Implant Abutment Selection

Before placing any abutment, there are many important criteria to consider:

1. Tissue depth, as measured from the crest of the tissue to the seating surface of the implant;

2. Implant angulation in relation to other implants or adjacent dentition;
3. Interarch distance measured from the implant seating surface to the opposing dentition.

The UCLA-type abutment is indicated for single tooth restorations where tissue height is less than 4mm. The abutment is screwed directly to the implant, eliminating the transmucosal abutment. Each UCLA-type abutment is available in both hexed and non-hexed versions. The hexed version is used for anti-rotational restorations such as custom copings and single tooth restorations. UCLA-type abutments are not placed until the restoration is completed.¹

Restoration Procedure

Four months after implant placement, the healing abutment is placed to allow the tissue to heal and mature. Approximately four to eight weeks later, the final impression procedure can begin. The healing abutment is removed, and the impression coping is properly seated in the hex of the

implant. After the impression coping is seated, radiographic verification is necessary to confirm the proper adaptation onto the implant. Prior to the final impression, a relief hole must be created in the impression tray to allow enough clearance for the removal of the impression coping retaining screw which holds the coping onto the implant. The final impression, using a firm and rigid material

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like Impregum, is carefully placed over both the coping retaining screw and impression coping and allowed to set. After final setting, the retaining screw is unscrewed from the implant and the impression is removed. The coping is securely held in place within the impression, and the implant laboratory analog is placed on the coping. The appropriate stone is poured into the impression. If vibration is used during the pour procedure, care must be taken not to alter the position of the impression coping. Prestabilization of the impression coping analog complex is advised. If the impression coping is subgingival, a gingival replication material, or soft-tissue cast, may be fabricated.²

At this time, appropriate facial and incisal enameloplasty of tooth #27 was performed to allow for adequate lingual clearance to the implant restoration. A mandibular arch impression is then taken.



Figure 5

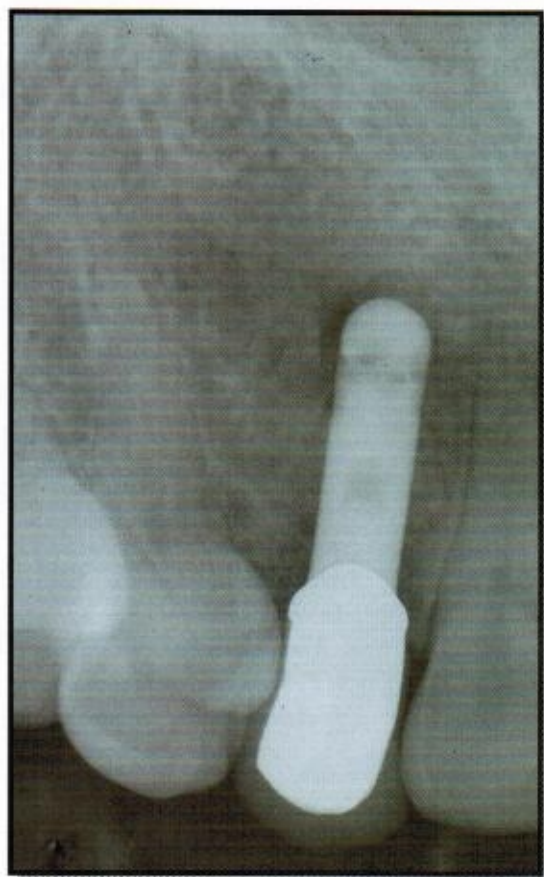


Figure 4

A final bite registration using Regisil PB completes the records needed by the lab to fabricate the restoration.

Placement and Final Result

The prosthetic coping is fabricated using a high noble alloy and placed on the implant with an internal hex head retaining screw. Radiographic verification is again necessary to confirm proper adaptation. Shade selection is determined and occlusal adjustments are performed on the coping before the case is sent to the lab for the addition of porcelain. To help the lab achieve the proper contours of the restoration, the seated coping is assessed.

The final restoration demonstrates the external hexagonal head which precisely fits into the internal hexagonal component of the implant. A gold, internal square head retaining screw should be used for final tightening.

Figures 2 and 3 show the final restoration in position with a final radiograph confirming excellent adaptation of the restoration to the implant (Figure 4). The buccal contour of the restoration has been duplicated to the contralateral cuspid. The gingival accommodation and health around the restoration is outstanding. All excursive and protrusive movements on the restoration have been addressed and the final contoured tooth #27 appears in Figure 5. When all aspects of esthetics are properly evaluated, the end result will be most rewarding and the patient's smile will speak for itself.

Discussion

This case involved many complex issues. First and foremost was the limited interdental space in which to place a restoration in conjunction with

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the supereruption of the opposing tooth. Second, the need to eliminate all laterotrusive movements which could jeopardize the long-term health and prognosis of the implant and restoration. Third, was the ability to esthetically duplicate the contralateral cuspid in an interdental space only half as wide. Fourth, determining the correct tooth shade in a patient who had previously "lightened" (with 10% carbamide peroxide) his teeth. Finally, meeting and exceeding the patient's "envisionment" of what his "new" tooth would look like.

Conclusion

The thought used to be that when we lost our permanent teeth we would be limited to either fixed bridgework or a removable partial denture. Dental implants have given us another treatment option, and in a sense, provided us with a *third* set of teeth. It is important that the restorative dentist be able to provide to his/her patients the best possible treatment for any given situation. Keeping up-to-date by becoming knowledgeable in dental implants and in their application to varying situations is crucial if a patient is to benefit fully from your care.

Esthetics with dental implants can be achieved even in the most difficult of situations. The key to any successful case is proper preparation and careful analysis of all factors present prior to beginning treatment. Understanding the relationship between implant and final restoration will ultimately lead to the mutual happiness of the dentist and patient.

Acknowledgement

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References

1. 3i Technical Bulletin, Bulletin #IISO13, June 1994, Implant Innovations, Inc., West Palm Beach, FL 33407.
2. *abid*



Dr. Nelson Y. Howard graduated from the UCLA School of Dentistry in 1986 and completed a Post-Graduate General Practice Residency at the V.A. Medical Center in West Los Angeles in 1987. He is a member of the American Academy of Cosmetic Dentistry, San Dieguito Dental Health Academy, and Founder and President of the West Coast Society for Cosmetic Dentistry. He has created and pioneered "The Non-Surgical Face Lift" concept and has extensive experience in the field of adhesive dentistry. He currently maintains private practices in Tustin and San Marcos, California, emphasizing cosmetic and restorative dentistry with a focus on esthetic enhancements.