

A Case Study in Implant Aesthetics

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This case illustrates the creative use of restorative dental design and fixed prosthetics for the functional and aesthetic improvement of an edentulous space in the mandibular anterior region. This patient was missing five mandibular anterior teeth and had been wearing a temporary removable partial denture. Even with bone and gingival augmentation, the final alveolar architecture was less than ideal for the placement of two dental implants in the position of the mandibular left cuspid and the right lateral incisor (Figure 01). The space available was constricted,

and getting five natural-sized teeth into the space would have required either enlarging the arch or rotating the teeth (Figure 02). The stability of the implants was excellent.

The patient was referred by Dr. Martin Rabin, a Seattle area periodontist, after the implants had been placed. In consultation with the patient, it was agreed that the goal was to end with a natural feeling and looking restoration that could be maintained easily. Because of the limited intra-arch space, the final prosthesis would need to have slightly rotated teeth in order for all five missing teeth to be both present and of the proper size.

After obtaining appropriate records and consents, implant impression copings and analogs (Zimmer Implants) were obtained. A decision was made to use the existing removable partial denture as the temporary prosthesis after the impression while the final restoration was being fabricated. A polyether impression was taken for improved stability in reproducing

the position of the implants (3M Impregum Soft); however, the material had to be flexible enough to allow its removal from the mouth without negatively impacting the periodontally compromised and mobile teeth. Toward that end, orthodontic wax was placed in all of the gingival embrasures prior to impressing to keep the impression from being locked in place. In addition to a standard shade tab (Figure 03), custom shade tabs were created for both the teeth and gingival tissues using composite resins and tints, since this approach would communicate the nuances of shading and characterization to the ceramist (Figures 04 and 05). The custom tabs were made by attaching the composite resin to a plastic handled micro-brush, which allowed the tints to be placed intra-orally (Figure 06). Photographs were sent to the laboratory with the case to compare the finer details of the shading with the actual tissues. This level of communication aided the ceramist significantly in creating a lifelike result.



A metal framework was fabricated, and opaqued and pink gingival porcelain was placed with a flat contour, which interfaced tightly with the alveolar crest (Figure 07). This design had three major advantages: it allowed for easy oral hygiene, reduced the impaction of food during mastication, and made all subgingival margins screw retained, thus eliminating all subgingival cement margins as well as the need to remove subgingival cement. The final crowns were designed with the three center teeth as one unit that would ultimately be seated using a permanent resin cement (Kerr Maxcem Elite). The abutment crowns would be cemented with a temporary cement (Kerr Tempbond Clear), which would permit total retrievability of the restoration and allow for future repairs or modifications (Figures 08, 09 and 10).

The gingival tissues were cleared from the head of the implant fixtures with a tissue punch (Figure 11), and the restoration was tried and radiographed to ensure a precise

fit (Figure 12). The restoration was then removed, and the three "pontic" teeth were cemented with a resin cement (Figure 13). The abutment crowns were placed during this process to ensure the most precise alignment of all of the restorative pieces. It was important to check that the intraoral driver would fit between the seated pontic teeth and still align with the screw to full depth for torquing (Figure 14). The restoration was then resealed, and the final abutment screws were torqued to 25 N-cm according to the implant manufacturer's recommendations (Figure 15). The abutment crowns were then seated with temporary cement, which gave the entire restoration retrievability, while the strength and retention of the restoration was screw retained.

The final photographs (Figures 16 and 17) show the restoration at three weeks after delivery, and indicate excellent gingival tissue blend and harmony with the adjacent dentition. By using creative design and technical precision, restorative

aesthetic dentistry can compensate for our lack of ability to completely rebuild supporting tissues to ideal contours. Clear communication between the patient, dentist, and the ceramist are integral to a successful outcome.

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Left Page: **Figure 1** The patient after implant placement with removable temporary partial denture in place. **Figure 2** The arch form showed a deficiency of space for properly sized and spaced missing teeth. **Figure 3** Shade tab from Ivoclar Chromoscope shade guide showed the body shade to be 130. **Figure 4** Custom shade tab made from Kerr Premise composite and Kerr Kolor Plus composite tints. **Figure 5** Gingival custom shade tab made with Cosmodent gingival shaded composites and Kerr Kolor Plus tints. **Figure 6** Microbrushes were used to hold the custom shade tabs. **Figure 7** Gingival aspect of the restoration showing the flat interface with the alveolar crest. **Figures 8, 9 and 10 (Figure 10 This Page)** The final prosthesis on the laboratory model. **Figure 11** Nobel Biocare gingival tissue punch held in the fingers was used to clear excess tissue away from the implant fixture. **Figure 12** The restoration being tried in and lightly torqued for radiographic verification of intimate seating. **Figure 13** The three "pontic" teeth (Ivoclar e-Max) were seated with a light cured resin cement (Kerr MaxCem). **Figure 14** The final restoration was checked to assure the torque driver had adequate clearance to seat the restoration intra-orally. **Figure 15** The final restoration fully seated and torqued to 25Ncm (Zimmer implants). Note slight blanching of the gingival tissue. **Figure 16** The abutment teeth have been cemented with Kerr Temp Bond Clear to allow for future retrieval of the restoration if the need arises. **Figure 17** Adding slight rotations to the individual teeth while maintaining the proper tooth size attained the most natural appearance. Photos courtesy of Dr. Rhys Spoor.

