DENTAL TECHNIQUE

Completely digital approach to fabricating a crown under an existing partial removable dental prosthesis by using an intraoral digital scanner in a single appointment

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Fabricating a crown to restore an abutment for an existing partial removable dental prosthesis (PRDP) is complicated. Numerous reports pertaining to the fabrication of a new crown to fit an existing PRDP have been published over the past 4 decades. A technique has been introduced to fabricate a crown with a laboratory scanner and computer-assisted design and computer-aided manufacturing (CAD/CAM) technology, in which the critical portions such as the retentive area, guiding plane, and rest seat are precisely reproduced with a resin coping. However, making a conventional impression is still necessary. Another technique used an intraoral scanner to restore a fractured tooth with a crown by scanning an existing diagnostic cast and a definitive cast. However, the long-term storage of a diagnostic cast is not always possible.

The accuracy of the digital impression compares with that of the conventional impression. The appropriate adaptation and retentive force of retrofitted crowns with CAD/CAM technology has recently been reported. This article introduces a technique for fabricating a retrofitted crown under an existing PRDP with an intraoral scanner and CAD/CAM technology in a single visit. The fabrication of an interim crown, the conventional laboratory procedure, and the long-term storage of a cast are therefore eliminated.

ABSTRACT

Retrofitting a crown to an existing partial removable dental prosthesis (PRDP) is difficult, labor intensive, and time consuming. This article presents an alternative technique for fabricating a crown under an existing PRDP by using an intraoral digital scanner and computer-assisted design and computer-aided manufacturing (CAD/CAM) technology. This technique involves less human error and provides a well-fitting restoration. (J Prosthet Dent 2016;115:668-671)

Figure 1. Evaluation of adequate clearance between abutment and metal framework.

TECHNIQUE

1. Place the existing PRDP to evaluate proper clearance between the maxillary left second molar and the PRDP framework (Fig. 1).
2. Extrude polyvinyl siloxane occlusal registration material (Regisil; Dentsply Caulk) over the tooth with a smaller diameter tip.\(^1,2\) Ensure that this material is applied to the critical portions and wipe excess material from the outer surface of the PRDP framework with wet cotton before it polymerizes (Fig. 2).\(^1,2\) Have the patient close to maximal intercuspal position until this material polymerizes.\(^2\)

3. After removing the PRDP and the pattern, assess the critical portions of the pattern. Draw a line on the buccal and occlusal surfaces of the pattern. Reseat the PRDP and the pattern.

4. Register a digital laboratory order and touch an icon of the tooth on the screen of an intraoral scanner (TRIOS Color Pod; 3Shape Inc). Check “Crown” for the prosthesis type and “Pre-preparation” for a scan of the pattern.

5. Make a digital impression of the maxillary teeth, pattern, and PRDP (Fig. 3). Retrieve the pattern and the PRDP. Grasp the noncritical area of the pattern with cotton pliers for an extraoral digital impression. Rescan the pattern starting from the bucco-occlusal area to facilitate data acquisition (Fig. 4). During the scan, the previously captured metal framework image on the pattern is deleted, and the imprint image of the framework is captured simultaneously.

6. Evaluate the removed region around the tooth. Because the adjacent tooth, the first molar, is absent, reinsert the PRDP so that the scanner system can easily identify the oral situation during the abutment scan. If the adjacent tooth exists in

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**Figure 2.** Crown pattern under existing partial removable dental prosthesis.

**Figure 3.** Software view of crown pattern and partial removable dental prosthesis.

**Figure 4.** Software view of complete crown pattern.

**Figure 5.** Software view of partially captured abutment.

**Figure 6.** Software view of completely captured abutment without application of partial removable dental prosthesis.
another clinical situation, reinserting the PRDP is not necessary. Scan the tooth as much as possible (Fig. 5). After removing the PRDP, scan the uncaptured area (Fig. 6). Scan the antagonist and obtain the maxillomandibular relationship. Send the scan data to a laboratory. Keep the pattern to provide the technician with the visual information of the pattern for the crown design.1,2

7. Design the crown with CAD software (3Shape’s Dental Systems; 3Shape Inc) (Fig. 7). The critical portions of the crown should be designed by the registered corresponding portions of the pattern.1,2,3 Establish the occlusal surface and the axial contour.

8. Send the design information to a 5-axis simultaneous milling machine (Arum 5X-200; DoowonID Co) and mill a cobalt-chromium alloy block (M3; Medipion).

9. Inspect the milled crown intraorally to verify the occlusal contacts, marginal adaptation, and fit to the PRDP framework.1 Lute the crown with cement (RelyX Ultimate Adhesive Resin Cement; 3M ESPE) (Fig. 8).

DISCUSSION

Fabrication of the milled crown beneath the existing PRDP was described. If a resin material is used for the crown pattern, the pattern may lock into the undercut around the adjacent teeth. However, as described by Livaditis,2 use of polyvinyl siloxane occlusal registration material eliminated this situation and provided a precise fit against the metal framework. The second advantage of this technique is that the crown can be milled in 30 minutes, and the crown fabricated in a day. However, the clinician must perform the scan procedure carefully, and the technician must have a complete understanding of the PRDP design and crown pattern.2

SUMMARY

Using intraoral digital scanner and CAD/CAM technology, the crown was fabricated against the existing PRDP efficiently and with less human error.

REFERENCES


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