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DENTAL TECHNIQUE

Interim restoration technique for gingival displacement with a feather-edge preparation design and digital scan

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ABSTRACT

A straightforward and time-efficient technique is presented for recording digital scans in single- and multiple-unit tooth abutments with feather-edge finish lines. The margins of the interim restoration should be precise and sufficiently deep in the sulcus so that the tissues can be properly displaced. Definitive intraoral scans should be made approximately 3 to 4 weeks after the tooth (or teeth) has been prepared to allow healing of the soft tissues. The interim restoration is first removed and then reseated after removing cement residue. First, a scan is made with the interim restoration in place. The abutment tooth or teeth are then erased from the original digital file, the interim restoration is removed again, and a new scan enclosing only the abutment tooth is made. (J Prosthet Dent 2020;123:580-3)

Gingival displacement plays a fundamental role in fixed prosthodontics for making definitive impressions.[1-5] It enables delivery of the impression material subgingivally to record the finish line and the tooth contour apical to it and to produce restorations with closely adapted margins in harmony with the tooth anatomy and gingival contour.[6-11]

The techniques adopted for gingival displacement can use 1 or 2 cords that can be impregnated with a hemostatic agent, a paste, or a combination of these 2 materials.[6-11] Soft tissue recession seems more likely to occur after gingival displacement with the double-cord technique than with aluminum chloride paste.[11,12] The amount of gingival recession has been shown to be independent of the type of gingiva or the width of keratinized gingiva.[11] The use of modified interim crowns or modified impression trays has been proposed to aid in delivering the light-bodied impression material.[13,14] Digital scanning has similar requirements; instead of a physical amount of material, there must be enough tissue displacement to allow light to reach all the necessary tooth areas.[15]

When tooth preparation with a vertical margin geometry such as feather-edge margins is used, the material does not necessarily need to flow beyond the margin area to capture the emergence profile and allow the dental technician to verify a precise adaptation of the restoration margins.[16-18] This is because, with feather-edge finish

Figure 1. Tooth prepared with feather-edge finish line geometry immediately after preparation.

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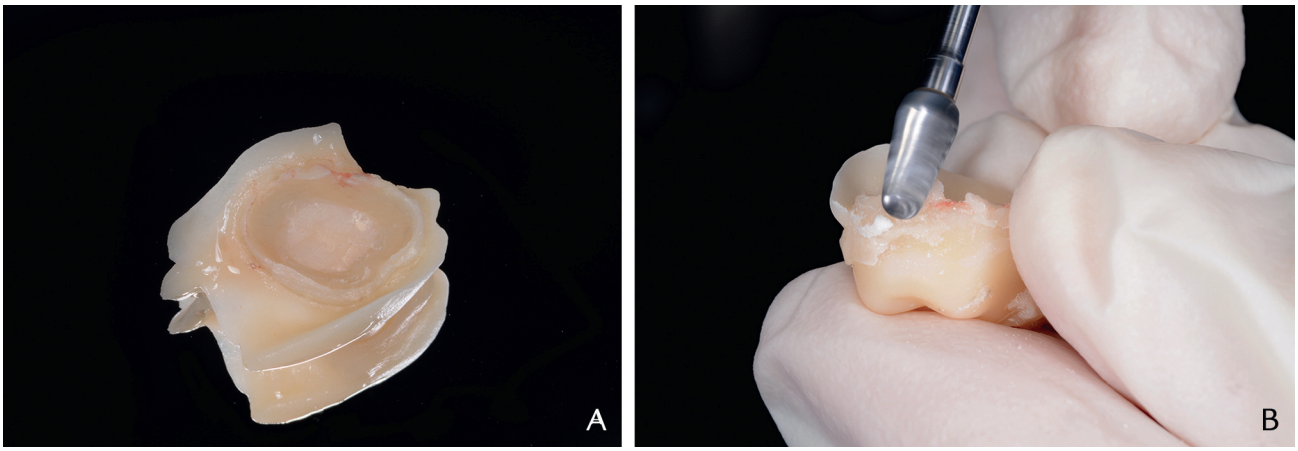

Figure 2. Interim crown relined. A, Excess resin present. B, Excess trimmed.

Figure 3. Flowable composite resin added to margins.

Figure 4. Interim crown removed and abutment tooth cleaned of cement.

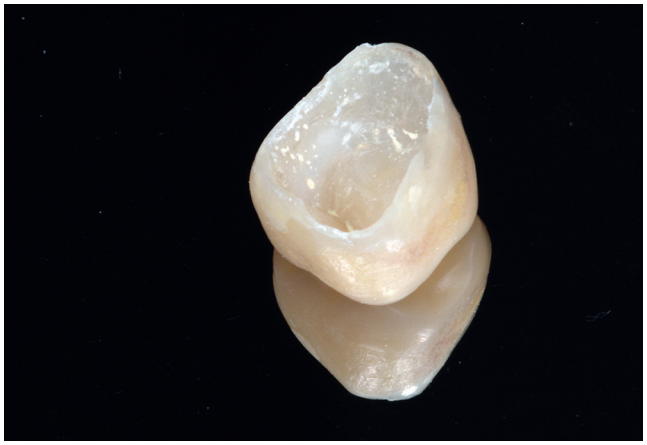

Figure 5. Excess cement also removed from intaglio surface of interim crown.

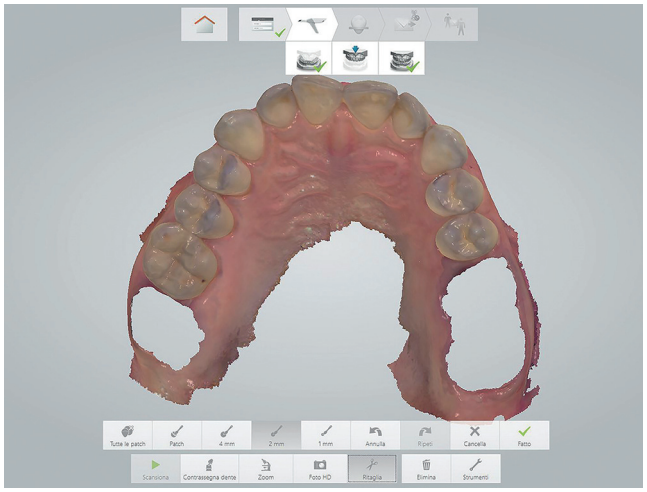

Figure 6. Abutments erased from file of scanned arch (single or multiple abutments can be processed in same manner).

Figure 7. A, Scan file of abutment. B, Same abutment scan shown as gray scale image.

lines, close adaptation of the restoration is ensured along the entire vertical wall of the abutment, regardless of the impression technique used.[19-21] In this sense, a digital scan and an analog impression essentially behave in the same manner.[22,23]

TECHNIQUE

This technique was developed for use in any clinical scenario where teeth are prepared with a feather-edge (vertical) finish line.[16-18,24]

1. Make a reduction of at least 1 mm along the axial walls and of approximately 0.3 mm at the finish line by using flame-shaped diamond rotary instruments (862012, 862016, 8862012; Komet). Keep the tooth preparation inside the sulcus or slightly below it to avoid violating the biologic width and damaging the connective tissue attachment.[25-28] If the patient has a delicate, scalloped, and thin biotype, the tooth preparation should be kept as superficial as possible in an attempt to avoid gingival recession. Thicker, flatter gingival tissues usually allow slightly deeper finish lines.[25,26] Abutments need to be reduced by 1 to 1.5 mm at the occlusal surface for a monolithic zirconia restoration with a total angle of convergence of 6 to 10 degrees to provide adequate strength (Fig. 1).
2. After the tooth preparation is finished, reline the interim restoration (Protemp Crown; 3M) with resin (Protemp 4; 3M) and trim it with a tungsten carbide cutter (H79EF.104.040; Komet) or with a disk (946.104.180; Komet) (Fig. 2).
3. Use a low-viscosity flowable composite resin (Tetric EvoFlow, Ivoclar Vivadent AG) to reinforce the margin area of the interim restoration (Fig. 3) and to establish the emergence profile that will support and condition the soft tissues during the healing around the restoration.

Figure 8. Cemented definitive monolithic zirconia restoration. Gingival contour obtained by letting tissue heal around interim restoration can be used by dental technician for definitive crown contour.

4. Make definitive impressions 3 to 4 weeks after placing the interim crown. Remove the interim restoration, taking care to remove residual cement from the abutment (Fig. 4) and from the intaglio surface of the interim restoration (Fig. 5).
5. Reseat the interim crown to allow continued soft-tissue support, conditioning, and displacement.
6. Scan both arches (TRIOS; 3Shape) with the interim restoration in place and then erase the treated tooth from the original file (Fig. 6).
7. Remove the interim crown to allow scanning of the abutment tooth. This should take only a few seconds (Fig. 7). This step may be repeated when the treatment plan includes more abutment teeth and restorations.

DISCUSSION

The value of digital scanning has been debated in prosthetic dentistry.[29-35] Straightforwardly, precise clinical

protocols that can guide clinicians should enhance the benefit of scanning.

For single-abutment treatment, the use of intraoral scanners has been shown to increase the time-chair efficiency.[29-31] The technique presented in this article allows the management of periodontal tissue around the abutment in a straightforward and predictable way and improves treatment efficiency. Another advantage of the technique is that the scanner can record the conditioning of the gingiva by the interim restoration without the force of the impression material. This information can be used by the technician to create the definitive crown with the appropriate emergence profile (Fig. 8). The technique presented in this article could also be used with conventional impressions, but the selective cut scan procedure and the possibility of scanning only the prosthetic abutment make it ideal for a digital workflow.

SUMMARY

A technique is proposed that enables the clinician to quickly make digital scans of natural prosthetic abutment teeth with feather-edge finish lines by using only the mechanical displacement of gingival tissue afforded by properly designed and refined interim restorations.

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