

DENTAL TECHNIQUE

## Technique for fabricating individualized dentures with a gingiva-shade composite resin



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The esthetics of a dental prosthesis should harmonize with the soft tissues that surround the dentition, especially in the anterior region.<sup>1</sup> Poly-methyl methacrylate has proved to be the most successful base material for removable dentures.<sup>2</sup> However, conventional acrylic denture resin offers limited esthetics because it does not have the natural appearance of healthy gingiva. Therefore, complete or partial dentures that can reproduce the character of the natural gingiva and mucosa would meet esthetic demand.

The fabrication of a cosmetic denture has been attempted since the early 1950s; Pound<sup>3</sup> and Proctor<sup>4</sup> produced dentures designed to mimic the natural oral tissues by means of color-blending resins, fibers, and extrinsic stains. However, such procedures are complex and technique sensitive.<sup>5,6</sup> Haeberle and Khan<sup>5</sup> customized the shade of interim prostheses by mixing stock shades of visible-light polymerized resins. More recently, gingiva-shade composite resins (GSCR) have been developed for restoring the appearance of the gingiva in implant-supported, tooth-supported, and removable prostheses.<sup>7,8</sup> Shimizu and colleagues<sup>9,10</sup> investigated the shear bond strength of GSCR and heat-polymerized acrylic resin to find the most effective surface treatment that would improve both bond strength and durability. However, to our knowledge, little

### ABSTRACT

More natural dental esthetics have been sought by patients who wear conventional complete or partial dentures. Recently, gingiva-shade composite resins (GSCRs) have become available for replicating soft tissue for both fixed and removable prostheses. The technique presented is for fabricating individualized complete dentures. First the acrylic resin is mixed with a coloring agent and processed to modify the base shade of the denture. GSCRs are light polymerized onto a prepared space on the buccal surfaces of denture base to replicate the appearance of gingival tissues including blood vessels. The technique provides an outstanding natural, gingiva-like, appearance and allows complete dentures to harmonize with the individual patient's surrounding oral tissues. (*J Prosthet Dent* 2016;115:547-550)

has been reported on the application of GSCR to an acrylic resin complete denture. Therefore, a novel technique for fabricating a cosmetic complete denture is presented.

### TECHNIQUE

1. Prepare a trial denture with various colored waxes to match the color of the patient's gingival and other oral characteristics and make an intraoral photograph for reference during the laboratory procedure (Fig. 1).
2. Process the trial wax denture with a heat-polymerizing acrylic resin (SR Ivocap High Impact, Pink-V; Ivoclar Vivadent AG) mixed with a coloring agent (Aesthetic Intensive Colors, 06 brown; Candulor) at less than 5% to modify the base shade of the denture base resin (Fig. 2).
3. Prepare the space for applying the GSCR in the labial and buccal flange of the denture by using a

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**Figure 1.** Colored trial wax denture made with colored waxes.



**Figure 2.** Acrylic resin denture after heat-polymerization.



A



B

**Figure 3.** A, Prepared space for GSCR on denture surface. B, Light-polymerizing resin primer.



A



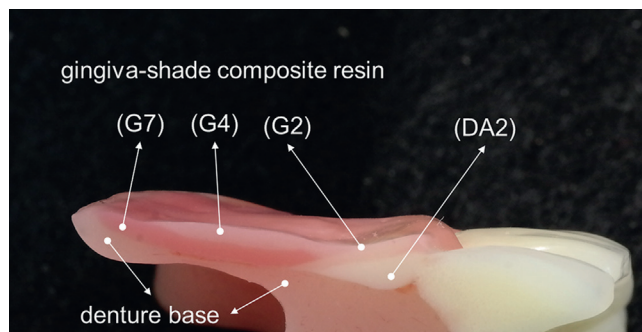
B

**Figure 4.** A, Composite resins layered on denture surface. B, Creation of gingiva line and interdental papilla.

round tungsten carbide acrylic resin bur, being sure to include the cervical and interdental papilla areas of the artificial teeth. Remove the denture base resin evenly to a thickness of about 1 to 2 mm with the aid of a silicone putty index and prepare an undercut along the marginal border (Fig. 3A).

4. Coat the prepared area with an adhesion primer (Palabond; Heraeus Kulzer) for the acrylic resin with a brush and let it dry for 30 to 60 seconds. When the area is sufficiently dry, apply a light-polymerizing resin primer (Visio.link; Bredent) and polymerize all primed areas with a visible light-polymerizing unit (Fig. 3B).





**Figure 5.** Sectioned example of gingiva-shade (G2, G4, G7) and dentin-shade (DA2) composite resins on acrylic resin denture base.



**Figure 7.** Polished customized denture.

5. Reproduce the patient's natural gingiva and mucosa using various GSCR (Gum G2-G7; TWiNY) by using a layer buildup procedure (Fig. 4A). A dentin-shade indirect composite resin (DA2; TWiNY) can be used initially to form the whitish attached gingiva. Create the cervical gingival lines and interdental papilla with a brush and carver (Fig. 4B). Figure 5 shows a sectioned example of the GSCR layered on the denture surface.
6. Characterize the gingival veins using a gingival stain (G Dark Red; TWiNY) and fibers (Gum Fiber GF71; GC Corp) (Fig. 6). For definitive shading and shaping of the GSCR, use gingival modifier resins (GM Gray/GM Trans; TWiNY). All of these procedures should be carried out with reference to Figure 1.
7. During the process of steps 5 and 6, GSCR and other modifying resins on the denture surface should be sufficiently polymerized using a gun-type light-polymerizing unit in an overlapping manner for 20 seconds at each point. Finally, for additional polymerization, place the denture in a laboratory light-polymerizing unit for 10 minutes and then finish and polish the denture surface in the conventional manner with pumice and polishing compound (Fig. 7).
8. The customized denture can then be delivered to the patient (Fig. 8).



**Figure 6.** Gingival veins produced by gingival stain and short fibers.



**Figure 8.** Patient with customized denture.



**Figure 9.** Mimicking saliva at gingival sulcus area with light-polymerizing clear resin.

## DISCUSSION

The customized denture accurately matches the natural gingiva and mucosa surrounding the opposing dentition. Modifying the base shade of the denture resin by mixing

a coloring agent is useful to control the definitive shade of the denture. Palabond primer contains a small amount of methacrylic acid to condition the acrylic resin surface and can be used to layer or shape the GSCR on the acrylic denture resin. Commercial red fibers for denture base resin can be used to express small blood vessels in detail. Additionally, a light-polymerizing clear resin (Plaquit; Dreve Dentamid) can be applied in the gingival sulcus area of artificial teeth to mimic saliva (Fig. 9).

The prepared undercut space for GSCR along the marginal border of the denture can prevent gap formation between the denture resin and GSCR after long-term use. Cosmetic dentures prepared with light-polymerized GSCR are easily repairable. However, because of the difference in the thermal expansion coefficient between acrylic resin and composite resin, relining the customized denture should be done with autopolymerizing acrylic resin.

## SUMMARY

This novel technique for fabricating customized cosmetic dentures using light-polymerized GSCR can provide an outstanding natural appearance. The disadvantages of this technique include the additional time and cost of creating a denture with custom esthetics.

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