

Use of a light-activated composite resin to adjust intaglio surface of removable prosthesis

Hiroshi Shimizu, DDS, PhD, Tomohiro Kawaguchi, DDS, and Yutaka Takahashi, DDS, PhD

Division of Removable Prosthodontics, Department of Oral Rehabilitation, Fukuoka Dental College, Fukuoka, Japan

This article presents a methodical procedure that facilitates the use of a light-activated composite resin to add and adjust the intaglio surface of a removable prosthesis to accommodate root copings. A surface preparation for methyl methacrylate resin was used to ensure the bonding between a light-activated composite resin and denture base resin. (*Asian Pac J Dent* 2011; 11: 51-53.)

Key Words: bonding, denture base resin, light-activated composite resin

Introduction

Patients frequently wish to complete the procedure for replacing missing teeth in a short period of time. Despite, the conventional procedure for an overdenture treatment is time consuming because root copings must be made and cemented prior to fabrication of a removable prosthesis. Even if the time saving technique¹ for the fabrication of root copings is used, additional multiple patient's visits must be required when compared to fabrication of the ordinary removable prostheses. Therefore, it sometimes can be recommended the fabrication and insertion of a removable prosthesis to restore aesthetics or function in the first place followed by cementing of root copings. Autopolymerizing acrylic repair resin has been generally used in such cases mainly due to its easy handling. However, there are porosities within the matrix and cracks between the matrix and poly(methyl methacrylate) particles in this material.^{2,3} This unsound character of autopolymerizing acrylic repair resin may introduce poor mechanical property,² discoloration, staining and an accumulation of microorganisms.

A light-activated gingiva-colored composite resin has been used for a portion of an implant infrastructure to provide shades as seen in the natural gingiva.⁴ It was assumed that this new resin can be used instead of autopolymerizing acrylic repair resin using some surface preparation for denture base resin prior to apply. This article presents a methodical procedure that facilitates the use of a light-activated composite resin to add and adjust the mucosal denture surface of a removable prosthesis to accommodate root copings.

Technique

Fabricate, insert and adjust a new removable partial denture prior to making and cementing of root copings (Fig. 1). Prepare the root surface and post space of the abutment teeth, make combined definitive impressions with vinyl polysiloxane impression material (Exafine, putty type and injection type; GC Corp, Tokyo, Japan), fabricate the root copings using a silver-palladium-copper-gold alloy (Castwell M.C. 12; GC Corp) by conventional means and cement them to the roots of the abutment teeth (Fig. 2). Make the escape holes from the intaglio surface to the polished denture surface of the lingual region of the removable partial denture (Fig. 3). Make the intaglio space for root copings with an appropriate rotary instrument and treat the ground surface using tribochemical silicate coating system (Rocatec adhesive bonding system; 3M ESPE AG Dental Products, Seefeld, Germany) with 110 μm grain-sized alumina (Rocatec Pre; 3M ESPE AG Dental Products), 110 μm grain-sized alumina coated with silicon dioxide (Rocatec Plus; 3M ESPE AG Dental Products) and silane coupling agent

(Rocatec ESPE-Sil, 3M ESPE AG Dental Products) in accordance with the manufacturer's specifications (Fig. 4).



Fig. 1. Removable partial denture in patient's oral cavity.



Fig. 2. Cemented root copings.



Fig. 3. Escape holes from the intaglio surface to the polished denture surface (left).



Fig. 4. Prepared intaglio surface of removable partial denture using tribochemical silicate coating (right).



Fig. 5. Adding of light-activated gingiva-colored composite resin (left).

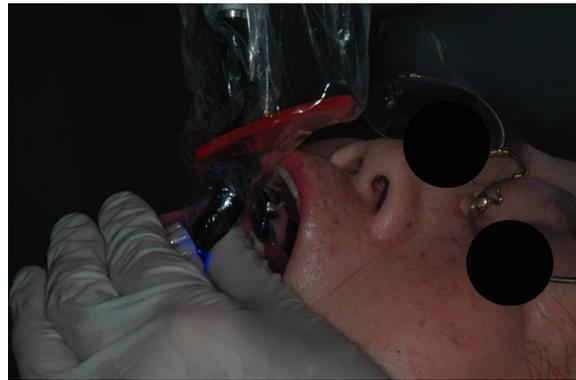


Fig. 6. Pre-polymerization with the light source from the polished denture surface direction (right).

Add light-activated gingiva-colored composite resin (Gradia Gum, GC Corp) to the freshly prepared intaglio surface of denture base (Fig. 5). Lubricate the root copings with petroleum jelly as a separating agent. Insert and place the removable partial denture into position. Pre-polymerize with the light source (G-Light; GC Corp) for 30 s from the polished denture surface direction (Fig. 6). Remove the removable partial denture and then complete a final polymerization from the intaglio surface direction in a light- polymerization unit (UniXS II, Heraeus Kulzer, Wehrheim, Germany) for 3 minutes. Polish the polished denture surface around the escape holes of the removable partial denture and adjust intraorally (Figs. 7 and 8).



Fig. 7. Intaglio view of adjusted removable partial denture (left).



Fig. 8. Occlusal view of completed polished denture surface (right).

Discussion

It is difficult to bond a light-activated composite resin each other⁵ or to acrylic denture base resin. The reason for the poor bonding capability of a light-activated composite resin may be the low resin component amounts of it. It was reported that the tribochemical silica coating method for a light-activated composite resin were effective for bonding to denture base resin.⁶ The tribochemical silica coating method is a procedure that uses impact energy to apply a silicate coating to a target surface. This system was originally introduced to enhance the bonding of resin composites to metallic dental materials.⁷ It appears that the reference 6 was the first to attempt to apply tribochemical silicate coating system in order to prepare surface of a denture base resin. The combined use of dichloromethane and silane coupling agent⁶ as well as the application of chemically activated 4-META resin using the brush-dip technique⁸ for a light-activated composite resin have also effect on bonding to acrylic denture base resin. Long-term clinical check-up should be necessary to evaluate this method as a valuable treatment option.

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Correspondence to:

Dr. Hiroshi Shimizu

Division of Removable Prosthodontics, Department of Oral Rehabilitation, Fukuoka Dental College

2-15-1, Tamura, Sawara-ku, Fukuoka 814-0193, Japan

Fax: +81-92-801-0513 E-mail: simizuh1@college.fdcnet.ac.jp

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