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A New Retrieval System for Cement-Retained Implant Superstructures: A Technical Report

Tetsuo Ichikawa, DDS, PhD, Osamu Ishida, DT, Megumi Watanabe, DDS, PhD, Yoritoi Tomotake, DDS, PhD, Hua Wei, DDS, PhD, & Chen Jianrong, DDS, PhD

Department of Oral & Maxillofacial Prosthodontics and Oral Implantology, Institute of Health Biosciences, University of Tokushima, Tokushima, Japan

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Correspondence
Tetsuo Ichikawa, Department of Oral & Maxillofacial Prosthodontics and Oral Implantology, Institute of Health Biosciences, University of Tokushima, 3-18-15 Kuramoto, Tokushima 770-8504, Japan. E-mail: ichi@dent.tokushima-u.ac.jp

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Abstract

This article discusses two methods for improving the retrievability of cement-retained implant superstructures. One method involves incorporating a removal screw in the superstructure and the second method uses a small dimple on the abutment, accessed through a vent in the superstructure.

The need for implant prosthesis retrievability during the early development of endosseous implants necessitated the use of screws to connect an implant prosthesis to the underlying abutment. More recently, with increasing numbers of partially edentulous patients, cement-retained implant prostheses have been widely used due to easier laboratory procedures, more favorable esthetics, and lower cost.[1-5] The principal disadvantage of a cement-retained, implant-supported crown is low retrievability, and that of a screw-retained, implant-supported crown is increased complexity of fabrication.

Various methods of improving retrievability have been reported. A provisional luting material[6] including the placement of cement in the occlusal half of the restoration only to minimize excess luting cement,[7] or the use of a cementation vent,[8] is often used in cementing the superstructure, but the prosthesis may still be difficult to remove. Chee et al[9] proposed a technique in which a screw threaded into the implant superstructure is used to displace the cemented superstructure. Okamoto and Minagi[10] reported a technique for removing a cemented superstructure, which is composed of a cylindrical guide hole on the abutment, an access hole, and a trial removing driver (1.5-mm diameter) to generate a force to raise the superstructure. Other techniques, such as the use of a cement- and screw-retained implant prosthesis[11] and the use of a location device to identify the position of the screw access channel to minimize destruction of the superstructure or abutment,[12] have also been described.

In this report, two methods for facilitating retrievability of cement-retained implant superstructures are described. One technique involves incorporating a small removal screw into the superstructure, and the other uses a rotating lever system whereby an instrument inserted through a hole on the lingual surface of a crown creates a shear force that will break the cement bond.

Techniques

Removal screw (Fig 1)

(1) Incorporate a small removal side screw (Titan screw, Degudent, Hanau, Germany: 1.2-mm diameter, 4-mm length) on the lingual surface of the cement-retained implant superstructure, positioned at an oblique angle from the occlusal table. The superstructure with the removal screw and screw hole is fabricated using the same technique as a conventional "horizontal (side) screw system." The superstructure into which the screw is partially positioned is cemented with a provisional cement (HY-Bond Temporary Cement Soft®, Shofu Inc., Kyoto, Japan).

Figure 1 A cement-retained implant superstructure with the screw (arrows) for removal.

(2) If retrieval of the cemented superstructure is desired, turn the screw clockwise. As the screw is turned, the bottom of the screw pushes against the abutment, and the superstructure is gradually separated from the abutment.

Rotating lever system (Fig 2)

(1) Prepare a small oblong dimple on the abutment and incorporate a vent opening in the superstructure, in line with the abutment dimple. (Figs 3A, B)
(2) Modify a metal dental instrument (i.e., modification of a conventional explorer, Explorers Single-end no. 01-221, YDM, Saitama, Japan) to allow its tip to insert through the vent opening to engage the dimple on the abutment. (Figs 3C, D)
(3) If retrieval of the cemented superstructure is desired, insert the metal instrument through the vent opening and engage the dimple on the abutment.
(4) Rotate the instrument in an occlusal direction, using the dimple as a fulcrum. The shear force causes the provisional cement bond to loosen and enables removal of the superstructure from the abutment with little stress.

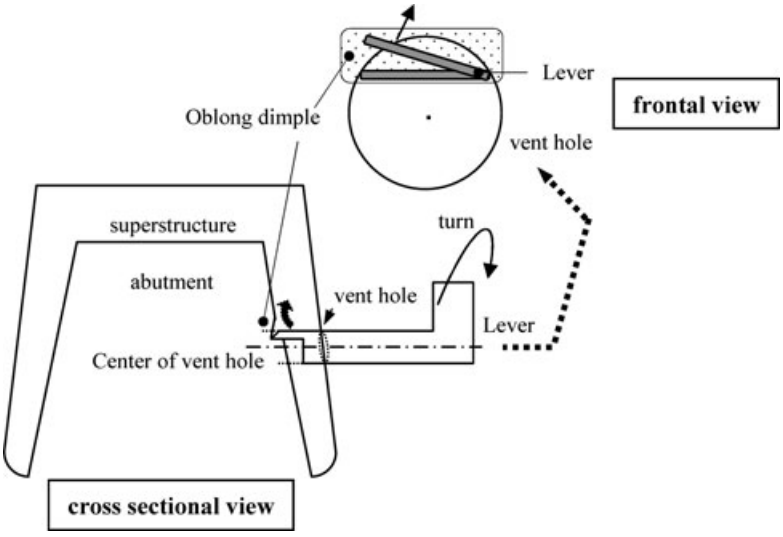

Figure 2 Rotating lever system.

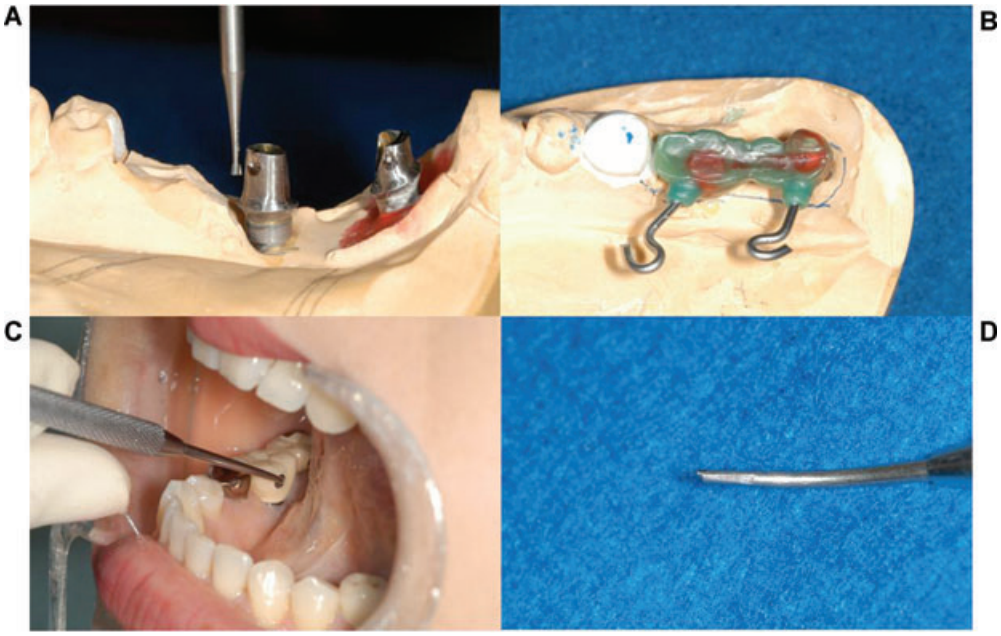

Figure 3 Clinical procedure of the "rotating lever system." (A) Oblong dimples are formed using an inverted cone bur. (B) Waxing-up of the superstructure with a lever. (0.9-mm diameter Co–Cr wire is bent as the lever. The lever is also used to remove the superstructure.) (C) A custom-made lever is inserted through a vent opening in the superstructure, pushed to the abutment, and turned to generate sufficient shear force to remove the superstructure. (D) A modified metal instrument is used to engage the oblong dimple.

Discussion

The cement-retained superstructure can be used more universally, and the predictable retrievability allows for treatment of complications such as abutment screw loosening or other maintenance. In this report, two methods for enhancing the retrievability of a cement-retained implant prosthesis are discussed.

The retrievable cemented superstructure using a removal screw has been described by Chee et al.[9] The technique uses a large removal screw in the same dimension as the gold screw positioned parallel to the long axis of the abutment. The procedure described in this article uses a small removal screw positioned at an oblique angle, thereby allowing the removal screw access to nonesthetic and nonocclusal contact areas.

The rotating lever system provides the convenience of prosthesis retrievability as well as venting for removal of excess provisional cement. The method is very easy to use as an oblong small dimple is formed on the surface of the abutment, and the lever can be easily made using a bended 0.9-mm diameter Co–Cr wire. Because the action to remove the superstructure is rotation, the manipulation in the oral cavity is simple.

Both methods are simple to incorporate and allow enhanced prosthesis retrievability and have been used successfully in the authors' clinic.

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