IMPLANTS
(/spear-review/category/implants/)

Implant Crowns – Cement, Screw or Both?

By Andy Janiga (/spear-review/author/andy-janiga/) on January 22, 2020 | (/bookmarks/bookmark/39604) RE

A big debate in implant (https://www.speareducation.com/spear-review/category/implants) dentistry is whether to utilize a screw-retained restoration or a cement-retained restoration. To understand the options available in modern implant dentistry, it's helpful to know the early history of dental implant restorations.

When implants were first introduced, many of today's common features, such as internal connections and anti-rotational designs, were not present. Since implant systems lacked anti-rotational features, it was necessary to splint an implant restoration to a natural tooth. As implant technology advanced, anti-rotational designs were introduced to help with the fabrication of free-standing implant crowns[1].

In the late 1980s, screw-retained implant restorations were developed to address concerns with retrieving implant crowns if they needed to be repaired or replaced. With advancements in implant restoration techniques, such as custom abutments, cement-retained implants became more popular[2]. By the early 2000s, most implant restorations were cement-retained.

Cement-retained implant restorations

Cement-retained implant restorations consist of an abutment upon which the implant crown is cemented. Abutments can be prefabricated "stock" or custom.

One of the advantages of a custom abutment is that the margins can be modified to create a supragingival interface between the implant crown and the abutment. This helps make it easier to remove excess cement. Cement-retained implant crowns are often considered more esthetic (/spear-review/2013/08/evaluating-facial-esthetics-facial-profile) than screw-retained implant crowns since the cement-retained implant crown does not have an access hole.

Figure 1: Cement-retained implant crowns. Note that there is no access hole through the implant crown.

However, cement-retained implant crowns can present challenges if cement is not effectively removed. This is especially true for prefabricated abutments, where the margins can be millimeters subgingival. Multiple studies have demonstrated that patients with cement-retained implant crowns with excess cement are at a higher risk of developing peri-implantitis.

Dr. Chandur Wadhwani, a Seattle-area prosthodontist, demonstrated how excess implant cement can lead to inflammation around implants, which in turn contributes to bone loss and peri-implantitis[3]. As a result, it is advised to design implant crown margins to aid in removing excess cement and take a post-cementation radiograph to determine if excess cement remains after delivering a cement-retained implant crown.

Dr. Georgios Kotsakis, a University of Texas Health Science Center School of Dentistry faculty member, suggests designing implant crown margins that do not extend more than 1 mm subgingivally, and to consider using a zinc oxide eugenol or zinc phosphate cement rather than a resin-based cement. Resin-based cements may experience a greater degree of biofilm accumulation than zinc oxide eugenol or zinc phosphate cements, leading to a great risk of inflammation around the implant restoration[2].

In addition, an impression of the intaglio surface of the crown can be used to minimize the amount of excess cement in an implant crown. Prior to cementing the restoration, the intaglio surface of the implant crown is lined with Teflon tape. Putty, impression or bite registration material is injected into the intaglio surface and allowed to set. This creates a die of the implant crown. When it is time to cement the restoration, the Teflon tape is removed, a thin layer of cement is placed in the intaglio surface of the crown, and the crown is seated back on the die. Excess cement will be extruded extraorally, minimizing the chance of leaving excess cement around the implant restoration[4].

Figure 2A (left): Putty material placed into implant crown. Figure 2B: Custom die created to express excess cement extraorally prior to cementation.

Screw-retained implant restorations

A screw-retained implant restoration can be fabricated instead of utilizing a cement-retained implant restoration. Screw-retained implant restorations consist of a one-piece structure with the implant connection and implant restoration as a single unit.

With current research demonstrating the risks of peri-implantitis associated with cement-retained implant restorations, many dentists are utilizing screw-retained implant crowns for single unit implant restorations.

Figure 3: Screw-retained implant crown. Note the screw access hole on the occlusal.

Two main advantages of screw-retained implant crowns are that they minimize the risk of peri-implantitis when compared to cement-retained implant crowns and are also easier to retrieve. The ability to retrieve the restoration is useful if the implant crown needs to be repaired or replaced due to fractured porcelain or an open contact developing between the implant crown and the natural tooth[5].

However, drawbacks of a screw-retained design are that these restorations can be difficult to seat on the implant platform and the presence of a screw access hole can lead to an unesthetic result if not managed properly.

The ‘screwmentable’ implant crown

The “screwmentable” implant crown is another possible treatment option that combines the advantages of both cement-retained and screw-retained implant restorations. In the screwmenable implant crown, the abutment and implant crown are cemented extraorally. This can be done by the lab prior to the appointment or chairside.

In the chairside procedure, the abutment is placed on the implant and the implant crown is adjusted as if it is a cement-retained restoration. After the contacts and occlusion are adjusted, the abutment is removed, the implant crown is cemented to the abutment extraorally and excess cement is removed.

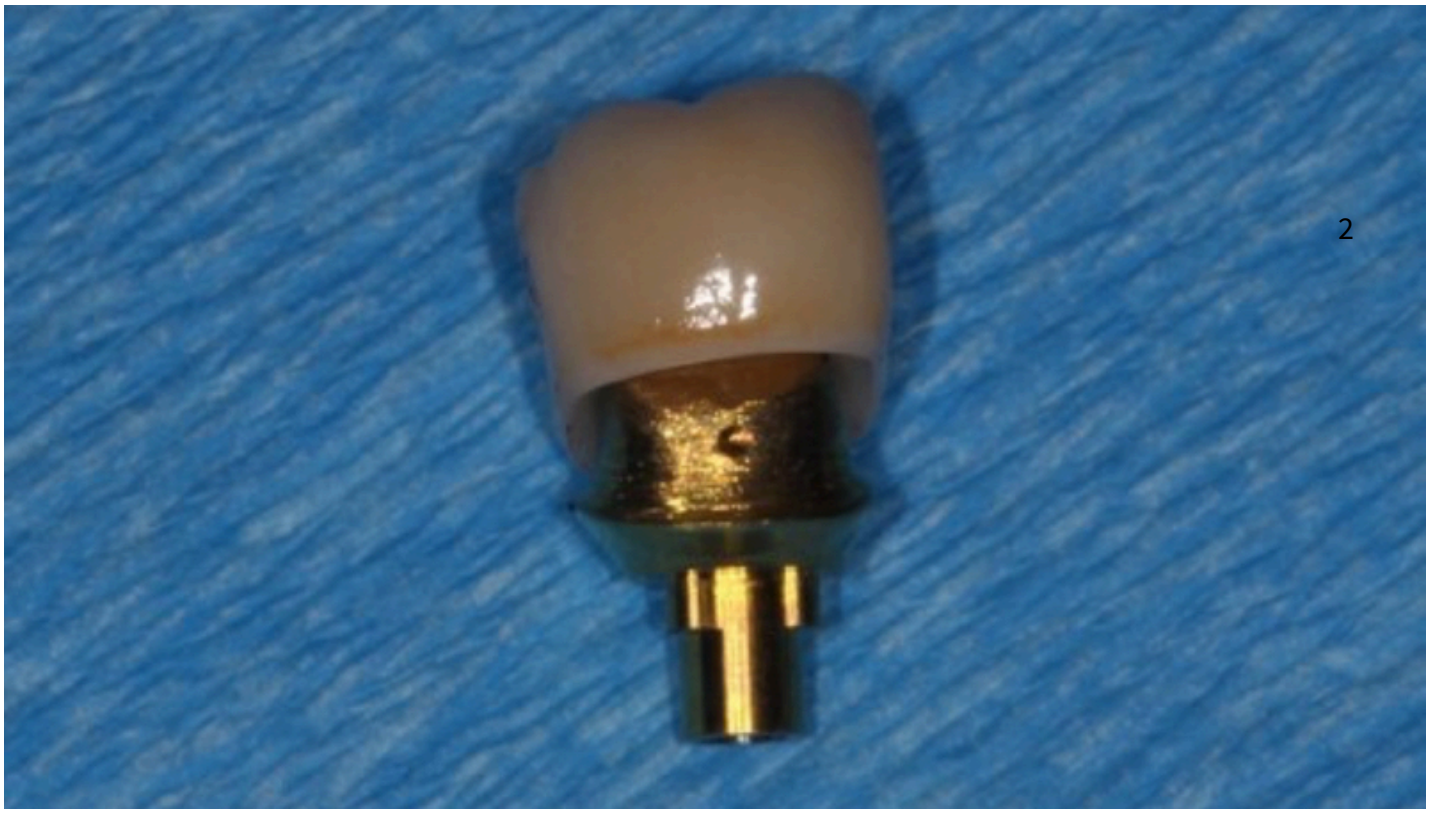

Figure 4A: Screwmentable implant crown prior to cementation.

Figure 4B: Abutment seated intraorally. The crown is adjusted as if it were a cement-retained restoration.

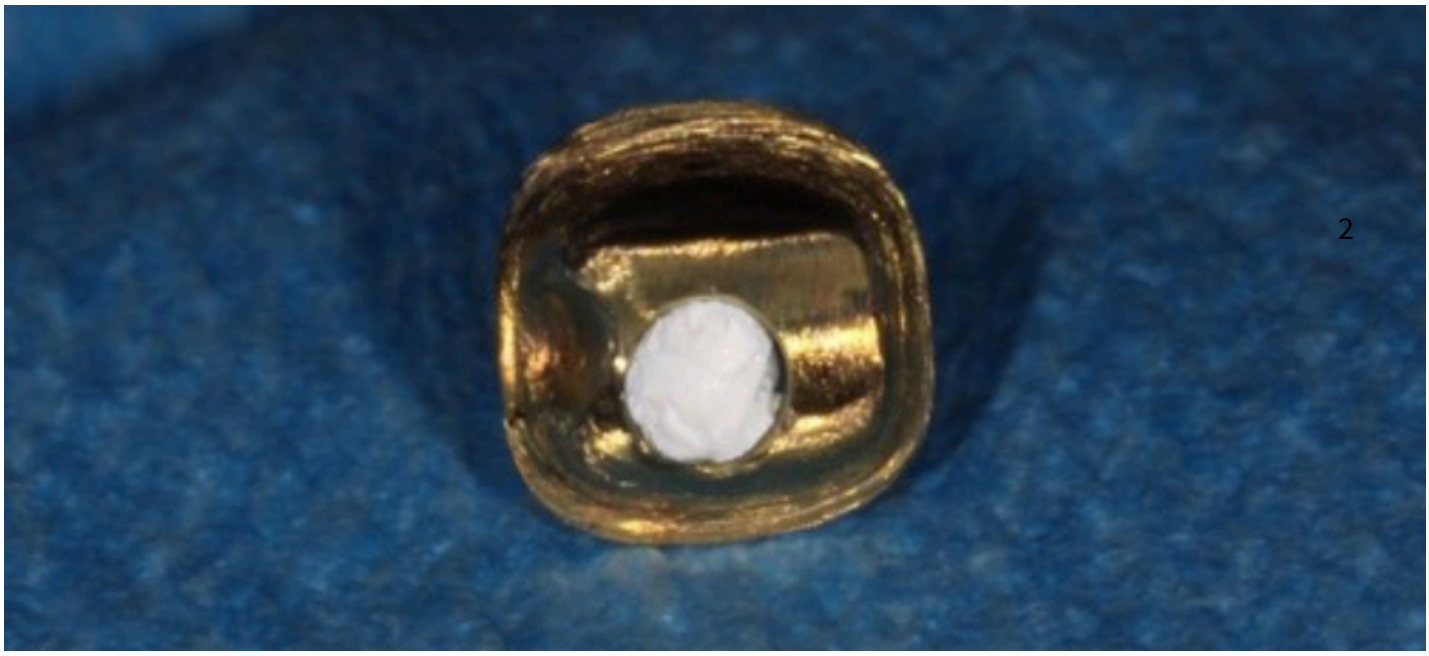

Figure 4C: Abutment removed, Teflon tape placed in access.

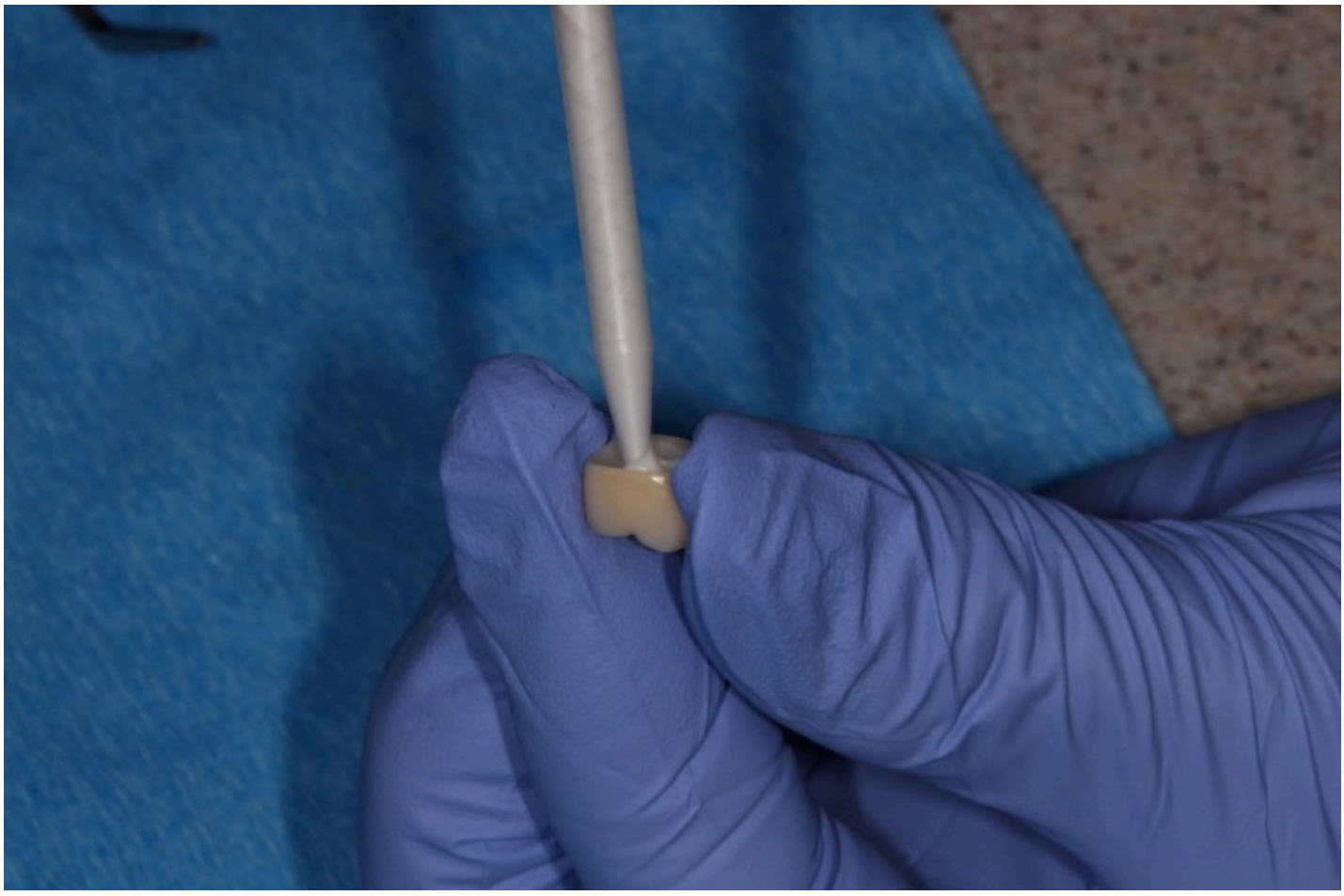

Figure 4D: Cement placed in implant crown extraorally.

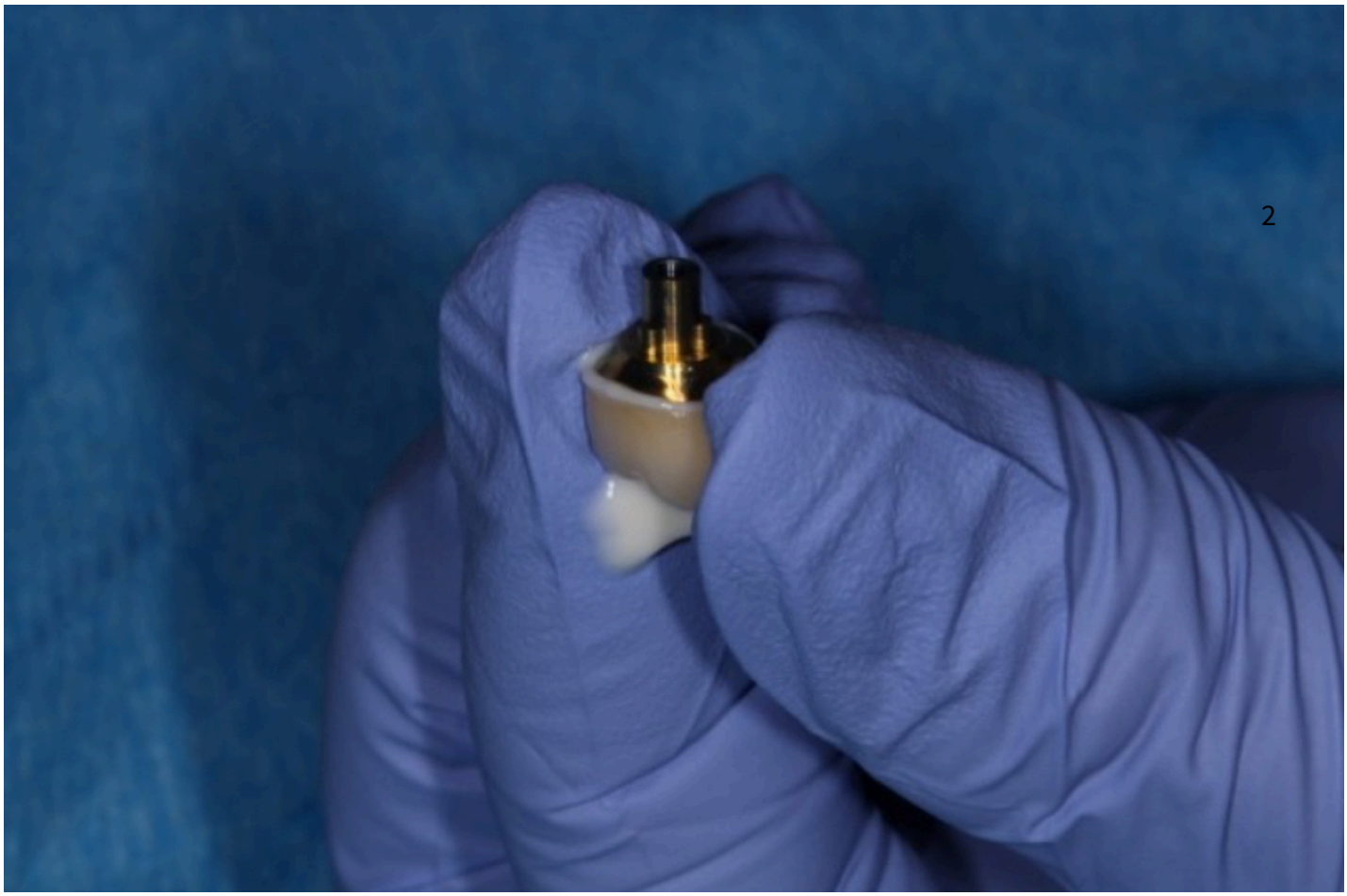

Figure 4E: Abutment and crown cemented extraorally.

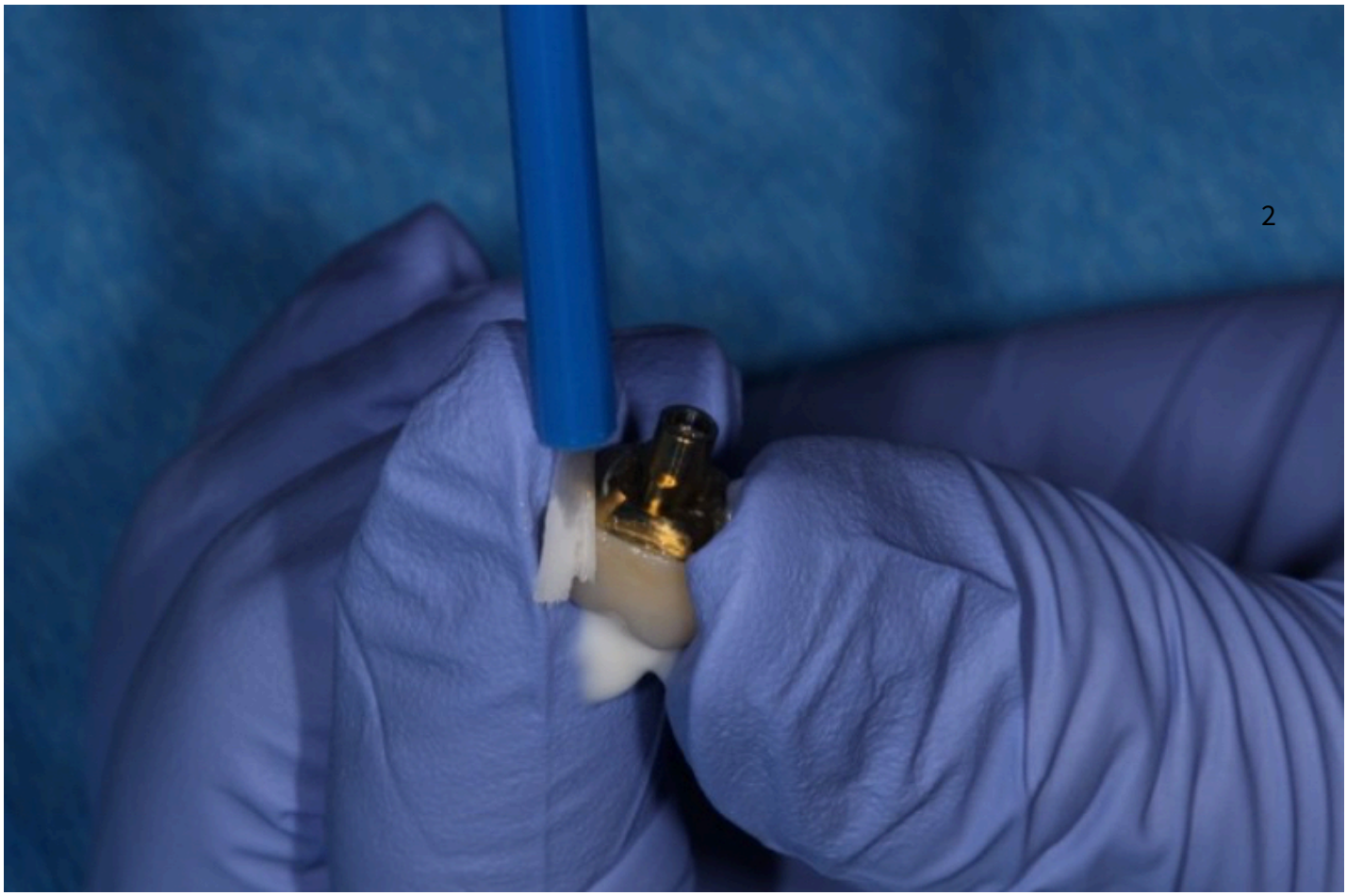

Figure 4F: Extraoral removal of excess cement.

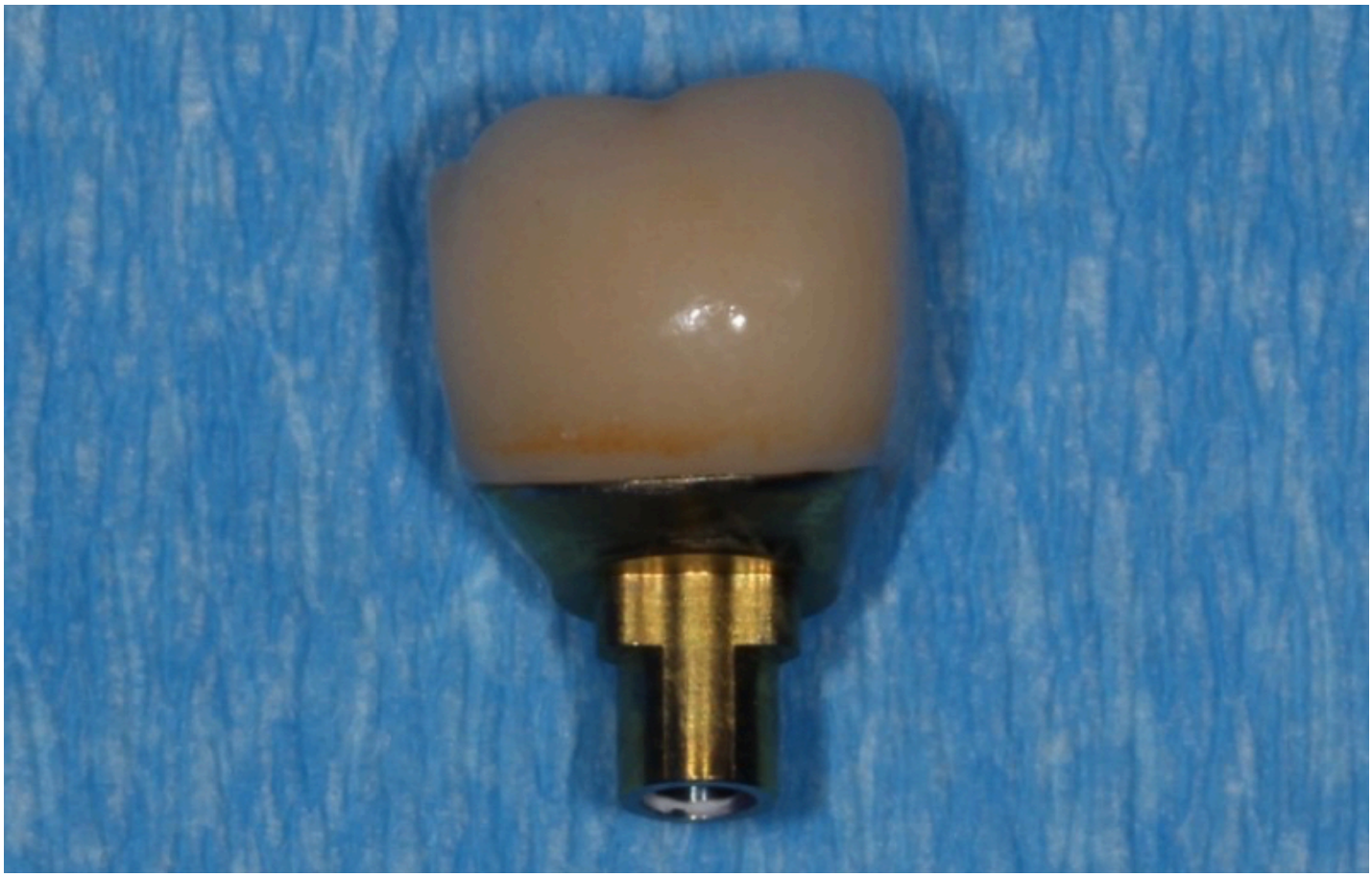

Figure 4G: Screwmentable implant restoration final product.

Figure 4H: Screwmentable implant crown seated intraorally.

Figure 4I: Access covered, delivery of screwmentable implant crown.

The abutment-crown complex now acts like a screw-retained restoration that is ready to be delivered.

In conclusion, there are various ways to restore single unit implants. Depending on the clinical situation, screw-retained, cement-retained or screwmentable options can be predictably utilized to restore implants with restorations that have ideal form and function.

Andy Janiga, D.M.D., is a contributor to Spear Digest.

References

2

1. Spear, F. “Connecting teeth to implants: The truth about a debated technique.” JADA. 2009; 140 (5): 587-593.

2. Kotsakis, G.A., et al. “Investigation of the association between cement retention and prevalent peri-implant diseases- A cross-sectional study.” J Periodontol 2016; 87 212-220.

3. Wadhwani, C., et al. “Radiographic detection and characteristic patterns of residual excess cement associated with cement-retained implant restorations- A clinical report.” J Prosthet Dent 2012; 107: 151-157.

4. Wadhwani C and Pineyro A. “Technique for controlling the cement for an implant crown” J Prosthet Dent. 2009; 102: 57-58.

5. Greenstein, G., et al. “Open contacts adjacent to dental implant restorations- Etiology, incidence, consequences, and correction.” JADA 2016- 147 (1)- 28-34