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CASE REPORT

How to Avoid Cementation Problem that Leads to Irreversible Peri-Implantitis on Implant Restorations

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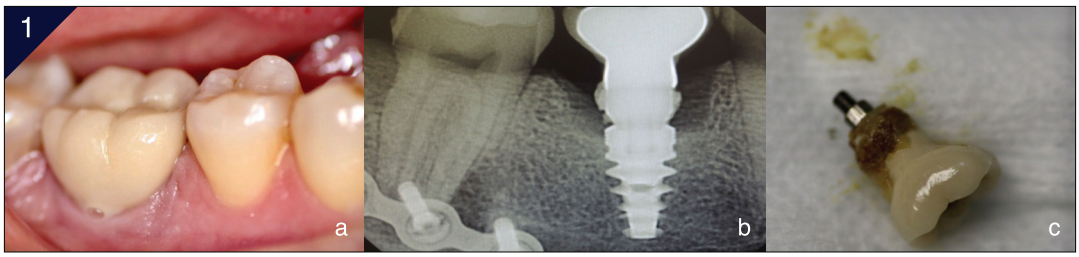

Figure 1a-c. Peri-Implantitis is a growing problem in implant dentistry. Bleeding and suppuration are common symptoms. Excess cement left inadvertently sub-gingivally on the surfaces of the abutments and implants are often linked with peri-implantitis.

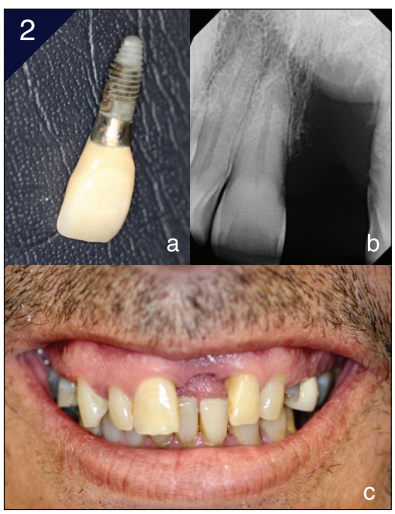

Figure 2a-c. Cement can be very difficult to remove and may be to be pushed in the gingival sulcus and stick onto the implant surface causing bone loss and eventually the loss of the implant.

Background and Purpose

In the last few years an increase in Peri-Implantitis has been attributed, in part, to the excess cement left around the implant collar and threads, leading in many cases to bone loss and even the complete failure of the implant treatment.[1,2,3,4,5] (Figures. 1 & 2)

The purpose of this case study is

1. To illustrate proper cementation of dental implant crowns to reduce cement induced implant failures.

2. To present alternatives to cement-retained crowns that are 1) the Screw Retained–Cemented Implant Crown (SR-CIC) or Hybrid Implant Crown and 2) a screw-retained crown using the Angulated Screw Channel concept or the Dynamic Screw Channel concept.

Introduction

The dental implant should be placed in an optimum position according to the predetermined prothetic restoration. A Screw Retained Implant Crown is mostly desirable when possible.[4] Successful result of any implant restoration is depending on the presence of adequate thick and attached gingiva, an adequate abutment margin placement (Fig. 3), an adequate abutment height and taper (Fig. 4), and adequate cementation protocol. (Figure 5)

Figure 3a-b. In the esthetic zone, a cemented implant restoration is often required. Abutment margins are kept at or slightly under the gingival margins.

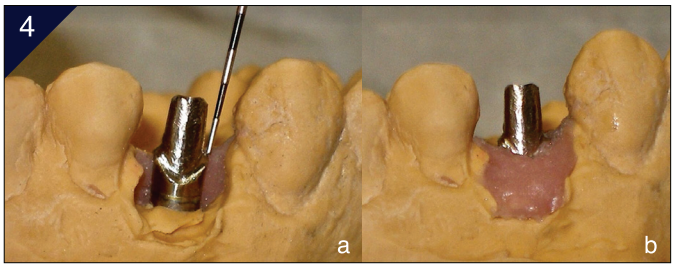

Figure 4a-b. A min of 3-4mm height and 10-15 degree taper are a prerequisite to minimize prosthetic crown loosening.

Figure 5a-d. Cementation technique of cement-retained implant fixed partial denture.

One way to reduce the dependence on the cement-retained restoration when a screw-retained restoration is not feasible, is the Angled Screw Channel (ASC) abutment or the Dynamic Screw Channel (DSC) abutment (Fig. 8), rendering the placement of the screw opening at the lingual surface. (Figure 9)

In case a cement-retained implant restoration is indicated, an adequate cementation protocol must be followed so no excess cement is left behind in the implant gingival sulcus. (Figure 5)

Implant Restoration Cementation Protocol

Once the restoration has been approved by the patient and adjusted, the cementation process proceeds as follows:

1. Fabricate a chairside duplicate abutment using a PVS bite registration material (Futar D for example). Extrude the PVS material inside the crown and form a handle-base.

2. Place the implant abutment over the implant in the patient mouth and torque it to implant company specification. (For DENTIS™ Implant level abutment, the torque is 30 Ncm).

3. Fill the crown with a radio-opaque cement such as Temp Bond and seat fully the abutment duplicate into the crown, remove all excess cement outside the mouth. keep in mind that you need to work fast.

4. Add a tiny dap of temporary cement inside the crown then seat the crown on the abutment, and clean any excess.

5. Make a final periapical radiograph.

The Screw Retained–Cemented Implant Crown (SR-CIC) (Figure 6 & 7)

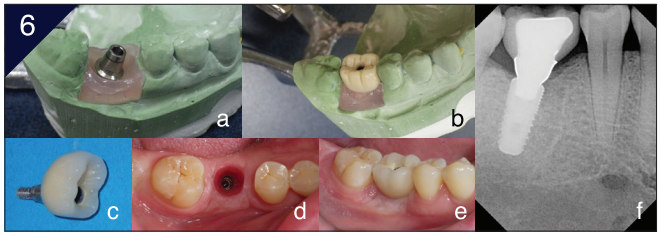

Figure 6a-f. Screw Retained–Cemented Implant Crown (SR-CIC) protocol. Implant level impression is made 2-piece. DENTIS™ abutment is selected and placed on the cast. A metallo-ceramic crown is made with a hole at the occlusal surface, then cemented in the lab after removing the abutment from the cast. a) 2-piece abutment on the cast. b) Full contoured wax then a wax cut-back for an adequate porcelain thickness. c) Final crown cemented over the abutment. d) Occlusal view of the implant site. e) The implant crown over the DENTIS™ S-Clean implant. f) Final radiograph.

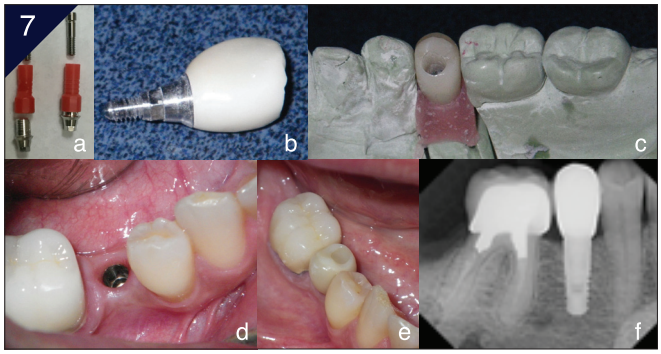

Figure 7a-f. Screw Retained–Cemented Implant Crown (SR-CIC) protocol. a) Ti-base of DENTIS™ UCLA abutment was used after heat removing the red plastic sleeve and was placed over the lab analogue. b,c) A zirconia crown veneered with e-max ceramic was fabricated over Ti-base. Then, it was cemented with resin cement. d) Intraoral photo of the DENTIS™ S-Clean implant. e) The hybrid implant crown in the mouth. f) Radiograph of the implant crown on implant of the mandibular right second premolar.

This procedure eliminates the cement interface inside the mouth, and avoid the pitfalls of cementation, and renders the implant restoration a screw-retained type. A Ti-base and CAD/CAM or stock abutment may achieve the same objectives.

The objective is to fabricate a regular crown with a hole that fits over the prepared stock abutment (or if desired, a custom-abutment).

1. A custom abutment, a Ti-base of a UCLA abutment or a prepared stock abutment, is fabricated, or selected, or milled in the lab or in the office. The abutment margins can be juxta-gingival or subgingival, especially in the esthetic areas.

2. Sandblast, and if necessary, apply an opaquer onto the abutment in case of an all ceramic crown.

3. A crown with an access hole is fabricated using the normal procedure or the CAD/CAM technology (chairside) with the material of choice (Metallo-Ceramic, E-max, or Zirconia)

4. Make any necessary adjustment to fit and adapt the two-pieces together.

5. Silane the crown as needed and cement using a resin cement keeping access hole free of cement.

6. Remove all excess cement outside the mouth and polish the assembled abutment crown.

7. Try-in and torque the SR-CIC as required. Verify seating with an X-ray.

8. Fill the access hole with a Teflon tape or with a light PVS plug and seal it with an appropriate bonded composite restoration.

The Screw-Retained Implant Restoration using Angulated Screw Channel (ASC) or the Dynamic Screw Channel (DSC) Concept (Figure 8 &9)

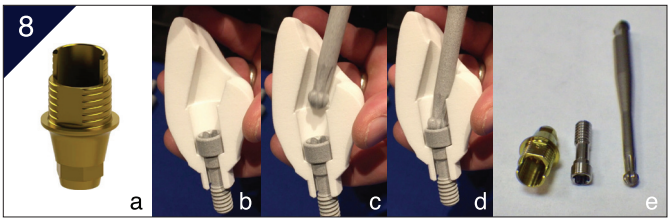

Figure 8a-e. a) Titanium base for DENTIS™ S-Clean Implant from Preat Corp. b) Cross section of an anterior crown where an Angulated Screw Channel (ASC) base is used. The ASC implant screw in position. c) Screw driver accessing the screw head. d) The screw driver engaging the screw head. (Courtesy of Preat Corporation; www.preat.com; 800 2327732. e) Dynamic angulated screw channel titanium base abutment compatible with DENTIS™ S-Clean that can correct angulation up to 25° with its 3.0 hexalobular screw and its screw driver.

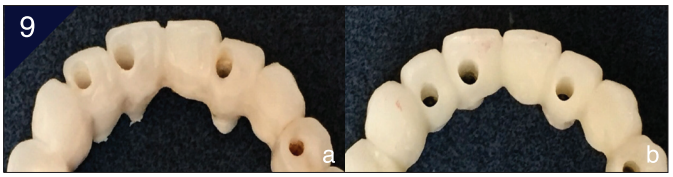

Figure 9a-b. Moving the screw access hole from an incisal position (a) to a more lingual position (b) is the result of using ASC abutment.

The purpose of using a ASC or DSC is to move the anterior screw access hole lingually or to move the posterior screw access opening towards the middle of the occlusal surface rendering the restoration a screw-retained restoration. The technique is as follows:

1. Fabricate a master cast from an implant level impression.

2. Order a dynamic angulated screw channel Titanium-Base abutment or a UCLA Dynamic abutment.

3. Mill a Zirconia crown and cement it over Ti-base abutment. When a metallo-ceramic restoration is indicated, use a dynamic UCLA abutment (from Preat Corp.), do a full-contoured wax pattern, then make a silicone index, followed by a wax cut-back making a less than a 2mm of space for ceramic application. Cast the wax pattern with precious metallo-ceramic alloy, then apply porcelain.

4. Use the corresponding screw and the corresponding screw driver for the Dynamic or Angulated Screw Channel, torque it to 25Ncm.

Conclusion

When needed, proper cementation technique must be used to avoid cement implant complication. It is always advisable to plan a screw-retained restoration whenever possible. When an implant angulation is present, an alternative to the cement-retained restoration is to use the Angulated Screw Channel concept. Soft tissues respond more favorably to screw-retained crowns when compared to cement-retained crowns.

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Conflict of interest:
The author declares that he has no conflict of interests relating to this article.

Products Used

- DENTIS™ UCLA Abutment
- DENTIS™ Torque Driver
- Futar D. Kettenbach GmbH & Co. KG
- Ti-base Preat Corporation
- Angulated Screw-Driver Preat Corporation