

Screw-Retained or Cement-Retained Implant Restorations

BY FERNANDO J. PADRON, DDS; SERGIO RUBINSTEIN, DDS; MR. TOSHIYUKI FUJIKI

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Implant dentistry is executed with the ultimate goal of replacing missing teeth to restore form and function lost due to caries, gum disease, and trauma to the oral cavity. Placing dental implants should be done very carefully and with considerable planning to avoid adverse outcomes.

Currently, dental schools are teaching that “implant placement is prosthodontic driven.” The reason: Implant surgery is a pre-prosthetic surgery, and it must be performed to satisfy prosthodontic needs and indications.¹

Without restorative indication, there is no rationale for the use of implants beyond the occasional use for orthodontic anchorage.¹

With implant therapy, there are two phases involved: surgical and restorative. Both phases require careful diagnosis, evaluation, and planning.

There are two types of fixation methods for implant restorations: cement and screw retain. Both methods present advantages and disadvantages.

Cement-retained restorations allow more freedom for the implant position. Unfavorable angulation can be corrected with a custom abutment that will receive a cement-retained crown. This type of fixation method has been reported in the literature with lower incidence of porcelain veneer fracture and screw loosening when compared to screw-retained restorations.

It is often claimed that these restorations are more esthetic, because the crown covers the access screw hole. (Figure 1)

However, inadequate removal of excess cement at the time of cementation may introduce a severe complication – cement-induced peri-implantitis, which may cause the implant to fail.²

It has been reported in the literature that 80% of peri-implant disease is a direct result of bacterial colonization of extruded cement.

The problem with the cemented restoration is that we don't have a good verification of whether we eliminate the cement or not, because on the X-rays we can only see mesio-distally and not bucco-lingually. The majority of the cements

advertised for implant crowns are not radiopaque. The only cement that is radiopaque and can be used is Tempbond.

The other huge disadvantage of cement-retained implant restorations is the lack of retrievability. Screw loosening has been reported in the literature as one of the most common restorative complications. To access the abutment screw in a loose-cemented implant crown, the restoration needs to be removed. Generally, the friction created between the intaglio surface of the crown and the implant abutment when cement is added is too strong. It creates a “cold welding,” which compromises the implant crown removal procedure. Either the porcelain might fracture or chip or the crown needs to be sectioned and removed, which adds the lab cost of a new crown fabrication to the practitioner or patient. The implant can also be damaged in the removal process.

This problem is very difficult to deal with. It is true that it is easy to work with cement-retained restorations and custom abutments to compensate for non-ideal angulation. But don't you want to know how long it will take to rectify a problem? This is probably the most attractive feature of screw-retained crowns.

The main advantage of the screw-retained restoration is the ease of delivery and retrievability without damaging the fixture or the restoration.

Implant position will determine to a great extent what type of method of fixation can be used. The planning involved to place and restore an implant with a screw-retained fixation method is usually the same (or should be the same) as for a cement-retained crown. The steps are: anatomic wax-up of

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Figure 1: Cement-retained implant crown. Patient did not want to show the access screw hole in the occlusal table. Custom abutment and cemented PFM crown.

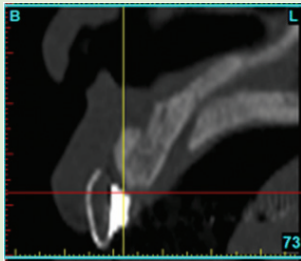


Figure 2: Implant planning. CBCT scan with radiographic guide. Guide shows the contour of the planned crown and the intended access screw hole. Modifications on implant angulation and angled abutments will be used in this case. Also bone graft procedures will be required at the time of implant placement.



Figures 3,4: Screw-retained implant crown. #7,10 screw-retained implant crown. Proper planning and excellent implant execution allows the access screw hole trajectory in the desired place.



Figures 5,6,7: Implant. Previous implant failed in #12 site. New implant angulation did not permit the access screw hole trajectory to come out from the occlusal table. Did not want cement involved on this case due to biologic compromise it might cause and the history of implant failure. It was decided to fabricate a screw-retained crown using the palatal screw technique. Patient is a bruxer, so metal-occlusal was recommended in this particular case.

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the missing tooth or teeth, duplicate of the wax-up, and then a suck-down fabrication, which will serve as a CT scan guide and a surgical guide.

With the CT scan and the radiographic guide, we can determine the spatial relation of the intended crown and implant position in relation to the adjacent teeth on the arch and residual bone. (Figure 2)

If the final crown is a screw-retained restoration, it will require a more precise implant placement with a surgical guide. This will ensure that the access screw hole trajectory comes out in the center of the occlusal table on posterior implants or at the cingulum for anterior implants. (Figures 3,4)

There is another technique in which no matter the implant angulation, it can still be restored with screw retention and avoid the use of cement. A custom abutment is fabricated, and then a mini-screw is tapped coming always from the mesio-palatal/lingual to ensure direct access to it. A crown then is secured with the mini-screw of 1.25mm diameter. (Figures 5,6,7)

Partial or full edentulism with the use of removable prosthesis can cause severe ridge resorption. Loss of the buccal

plate can be caused due to traumatic tooth extraction, endodontic abscesses, and advanced periodontal disease. Not all the patients will have a bone graft for socket preservation at the moment of extraction. These situations will create a challenge for the surgeon and restorative dentist when treatment planning implant-dentistry, due to the implant angulations. (Figure 8)

Anticipated contours of the final restoration will vary if the crown is screw-retained. For anterior teeth it is preferable for the crown to be close to the cingulum and away from the incisal edge to provide proper substructure support.

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Dr. Fernando J. Padron received his dental degree from Central University of Venezuela and completed a three-year residency in prosthodontics and one-year implant fellowship at Nova Southeastern University, Florida, from 2008 to 2012. He is an active member of the American College of Prosthodontists and a diplomate of the International College of Oral Implantologists. He is a prosthodontist in the practice of Sergio Rubinstein DDS & Associates PC, Skokie, IL.



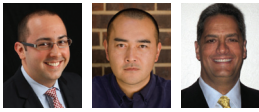
Toshiyuki Fujiki, RTD is a laboratory master ceramist in the practice of Sergio Rubinstein DDS & Associates PC. He has co-authored numerous articles and is an international lecturer.



Dr. Sergio Rubinstein received his dental degree in 1980 from the Universidad Tecnológica de Mexico. He completed his specialty training in periodontal prosthesis at the University of Illinois at Chicago, where he was an assistant professor. He invented a custom abutment to prosthetically correct misaligned implants. He is an international speaker, instructor, and author.



Figure 8: A case that shows the challenge for the restorative dentist due to implant angulation. The surgeon had to angle the implants to take advantage of the minimum bone volume available on this patient. The laboratory support was paramount to restoring this case with the screw-retained fixation method.



Implant Restoration

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This could result in a lingual bulky contour, but considering the advantages on the ease of delivery of the restoration and elimination of cleaning any excess of cement, would be more favorable than unfavorable. (Figure 9)

For provisionalization to sculpt peri-implant tissue, surgical sites, and immediate load cases, screw-retained provisional restorations are preferred over cement-retained. (Figure 10)

The screw-retained provisional restoration can gradually mold the tissue around the implant with gently applied pressure.

Cement-retained provisional restoration is more technique-sensitive. A PEEK (polyetheretherketone) or titanium implant cylinder modified with composite material needs to be prepped and customized to receive a temporary crown. To avoid cement extrusion to the peri-implant tissues, a finishing line needs to be positioned supragingival, causing an esthetic compromise if the implant is in the esthetic zone.

The indications for screw-retained restorations are the following:

- Cantilever bridges – Whenever doing a cantilever bridge, this prosthesis should be screw-retained. If cement is used, it could be debonded over time.
- When the patient has lost an implant – For a patient who has lost an implant, the incidence of failure rate for the second implant is higher. A screw-retained implant is preferred.
- Opening of the mesial contact on implants adjacent to natural teeth – A screw-retained crown is indicated because it is easy to retrieve to close the contact adding low fusion porcelain or gold.
- For long-term treatment planning and provisionalization – A screw-retained implant crown can be removed and a



Figures 11,12,13: In immediate load implant procedures, screw-retained restoration is preferred over cement-retained prosthesis.

screw-retained provisional with a cantilever pontic can be added if the tooth adjacent to the implant site is lost.

- Immediate load. (Figures 11,12,13)
- Deep implants.
- 4mm of inter-arch space.

Indications for cement-retained restorations:

- Implant angulation. (Figure 14)
- Esthetics demand access openings.
- Thin biotypes using zirconium abutments.
- Limited jaw opening.

It is very important that implant restorations are given careful prosthodontic planning before the implants are placed in the patient's mouth.

Once the implant has been restored, patients should be monitored regularly for maintenance and checked for bone loss, bleeding, and suppuration, irrespective of the type of implant fixation. Cement-retained restorations should be carefully assessed at each recall appointment due to the higher incidence of cement-induced peri-implantitis.

When a problem arises, either prosthetic or surgical, a screw-retained restoration would require less chairside time to correct.

Certainly there is no right or wrong choice when selecting one type of connection above the other, but clinicians need to be aware of the advantages and disadvantages of each type of prosthesis and make the appropriate decision based on the specific clinical situation.

References

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2. Pette G, et al Radiographic appearance of commonly used cements in implant dentistry. Int J Periodontics Restorative Dent. 2013 Jan-Feb; 33(1): 61-8. **END**

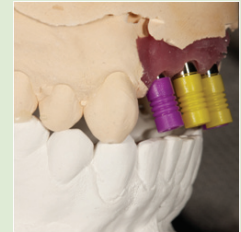


Figure 14: Angulated implants suggest a cement-retained restoration. In our experience we can restore any case with the palatal-screw technique to overcome extreme angulations.

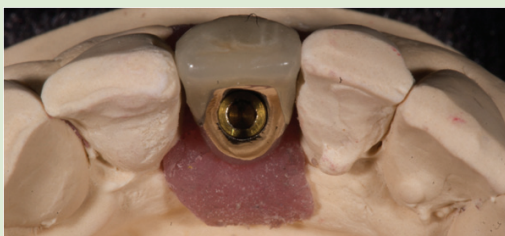


Figure 9: Screw-retained restoration on a lower incisor. Slight overcontour on the lingual aspect.



Figure 10: Screw-retained provisional #8 and for immediate load on full arches is preferred.