A Simplified Technique to Control Excess Cement Material Underneath Cement-Retained Implant Restorations: Technical Note

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Subgingival presence of remaining excess cement may lead to implant complications and failures. This is a technical report and advice on how to cement implant-supported restorations using a simple and universal method applying liquid petroleum jelly to the peri-implant sulcus after cementation. This simple and user-friendly method eliminates excess cement and should be used in the daily practice. Int J Oral Maxillofac Implants 2019;34:e17–e19. doi: 10.11607/jomi.7492

Keywords: cement-retained implant prostheses, cementation, complications

The risks and implant failures due to the subgingival presence of remaining excess cement material underneath cement-retained restorations have been reported. Many discussions in scientific meetings and publications are focused on this topic, and different cementation methods have been proposed by different authors. Research has been performed to evaluate the compatibility of cementation materials in cell cultures and in the tissues. In addition, to avoid complications due to excess cement material, recent studies try to explain methods for an accurate and complication-free cementation technique. It seems that the best method for cementation of implant-supported restorations has not yet been described. Therefore, many clinicians recommend the use of screw-retained prostheses. However, screw-retained restorations are more complicated to fabricate and may lead to esthetic problems in the case of implant angulations. There is sometimes a need to have the possible presence of the access hole in the facial aspect of the restoration.

An advantage of screw-retained restorations that has been emphasized is the issue of retrievability.

Cemented restorations have other advantages, and the issue of retrievability can be resolved using provisional types of cement with high retention. However, the retention of cement-retained implant-supported prostheses depends on many factors; these include the taper, length, width, surface area, finish, and number of implant abutments.

In addition, the method used to fill the screw access opening influences retention. Koka et al compared different cement materials and found that TempBond NE (Kerr) and zinc phosphate cement provided more retention when the abutment screw access opening was completely filled vs left unfilled, compared with another study, which found that a partially filled screw access opening provided more retention.

There is no doubt that there is a need for an optimal cementation technique avoiding excess cement within the peri-implant sulcular areas and underneath the restoration.

Based on a survey analysis from U.S. dental schools on the methods of cementation of implant-supported crowns, the most frequently used luting agent is a resin-modified, glass ionomer for cementing implant restorations. The five most commonly used materials to fill screw access openings are cotton pellets, composite resin, gutta-percha, light-polymerized provisional composite resin, and the Teflon cord. Most undergraduate and postgraduate programs teach students to fill the screw access opening completely to the occlusal surface.

The aim of this report was to demonstrate a simplified technique for cementation of implant-supported restorations in order to avoid excess cement underneath the tissues.
TECHNICAL NOTE

Since 1993, implants have been restored on a regular basis, and from 1996 to today, cement-retained implant-supported restorations have routinely been used. These are provisional prostheses for immediate provisionalization protocols or definitive fixed restorations (hybrid- or bridge-type prostheses). Zinc oxide eugenol cement has been recommended in the literature. In all these cases, the materials that are used are Temp Bond, Retrieve, or Implatemp ITC Non-Eugenol Temporary Cements (resin-based luting agent). The cementation technique used has been proven in various clinical settings, such as the Dental School at the University of Frankfurt/Germany (1993 to 2004), New York University College of Dentistry (2004 to 2007), Eastman Institute for Oral Health (2007 to 2012), and Stony Brook University School of Dental Medicine (2012 to today) in the residency programs and in the faculty practices. In addition, this technique was used in various clinical studies with implant-supported restorations on a routine basis. None of the treated cases using the simplified protocol have led to peri-implant problems and/or implant failure. The main characteristics of this technique are simplicity and universal use.

The following steps are important for this cementation method (Figs 1 to 3):

1. Isolate and sufficiently dry the abutments in all sides, as well as the peri-implant soft tissues, and isolate buccally and lingually with cotton rolls.
2. Sufficiently dry the restoration framework with an air syringe.
3. Mix the cement material following the manufacturer guidelines. With the use of a periodontal probe or a dental explorer, carefully apply a thin film of cement material within the prosthesis framework, and place the restoration over the abutments in the correct position. The patient should bite the cotton rolls at the left and right sides to bring the restoration into the exact position.
4. Immediately after this step (and in occlusion), apply 100% pure petroleum jelly in liquid consistency (Vaseline, Unilever) buccally, interproximally, and leave the liquid moisturizer to flow underneath the framework lingually, and if possible, within the peri-implant sulcular areas. To apply the Vaseline, use a plastic, disposable Monoject curved tip syringe (20 cc) and bring the liquid under pressure close to the margins of the restoration and into the peri-implant areas.
5. Leave the cement material to set for 30 to 60 seconds, and using the air-water syringe from the unit (under pressure), wash out the excess cement from the subgingival areas. A suction-tip allows suctioning of saliva and water during the irrigation period.
6. Do this irrigation process two to three times using the air-water syringe.
7. With a dental explorer, check finally for remaining cement material and leave the patient to rinse the mouth.

In the case of big restorations, the use of interdental brushes (in cylindrical shape) was additionally recommended during the setting period of the cement. These brushes should be used in buccolingual movement in full occlusal contacts to check for the excess of cement.

The final step is to check the occlusion and occlusal contacts of the restoration for an accurate position.

DISCUSSION

The presented cementation method for implant-supported restorations allows a simple technique, which can be used universally without high costs and special, advanced training. Considering that the peri-implant soft tissues contain circular fibers in the
peri-implant mucosa, there is a risk of impaction of cement material within the peri-implant sulcus, which may lead to complications and potential implant failures.

Independently on the implant platform position (crestal or subcrestal placement), the presented cementation technique can be used without risks from impaction of excess cement in the peri-implant soft tissues. In addition, the technique can be used for different implant designs as well as different types of restorations and provide an accurate cementation method without risks for the long-term implant prognosis. Using all the described steps of this method, the author strongly recommends this cementation technique for implant-supported restorations in the daily practice.

Due to the continuous problem of excess cement underneath implant-supported restorations and the simplicity in fabrication and management of the cement-retained prostheses, there is a need for continuous improvement of the cementation materials in order to provide a simple and complication-free treatment with excellent clinical outcomes. Systematic reviews recommended the use of zinc-eugenol cement material for the cementation of implant-supported restorations. This may lead to reducing risks of peri-implant mucositis.12

Types of cement display differing abilities to inhibit both planktonic and biofilm bacterial growth. Cement with the ability to reduce planktonic or biofilm growth of the test bacteria may be advantageous in reducing peri-implant diseases. In addition, cell response to various implant cements varied significantly, with osteoblast proliferation much less affected than gingival fibroblast cells. Furthermore, zinc oxide, noneugenol dental cement appeared to affect cells significantly less than the other test cements.4

Without a doubt, there is no evidence that screw-retained restorations have no risk of peri-implantitis. In a recent study from Scandinavian practices, moderate/severe peri-implantitis (bleeding on probing/suppuration and bone loss > 2 mm) was diagnosed in 14.5%.13 Most of the restorations were screw-retained. In contrast to this, Krebs et al14 provided data of implants with cement-retained restorations and low percentages of peri-implant complications. Even most of the failures (1.6%) occurred during the first year after implant placement and before prosthesis delivery; the implants showed low rates of peri-implant crestal bone loss after 204 months. Also, implants placed subcrestally or epicrestally and loaded after osseointegration was completed showed a low amount of crestal bone loss and no significant difference between subcrestally vs epicrestally placed implants.15 A study from Linkevicius et al16 showed that the cementation margin position influences the amount of undetected cement, and the deeper the position of the margin, the greater amount of cement was discovered.

A meticulous cleaning of the abutment/restoration complex is fundamental in order to control excess cement material, and with the method presented here, there is less risk of cement remnants.

ACKNOWLEDGMENTS

The author reported no conflicts of interest related to this study.

REFERENCES