When used for screw-retained ceramic and zirconia restorations, nano-ormocers stave off microleakage at access holes—and please aesthetically, too

In today’s highly aesthetic and digital dental environment, the all-ceramic milled restoration is quickly evolving to be the implant restoration of choice for both laboratory technicians and restorative dentists. The latest generation of digital scanners and state-of-the-art implant design software has enabled the restorative dentist to streamline the manufacturing of predictable and quick-to-customize, screw-retained pure ceramic or zirconia restorations. Often, however, the screw access hole that’s left is a “weak link” in the aesthetic restorative process because of its visible location.

An ideal restorative material for the sealing of screw access holes would both provide a seal against microleakage and make the location of the access hole inconspicuous. When SD Park identified the problem of microleakage from the access holes of screw-retained implants, he found that different filling materials exhibited different levels of microleakage—cotton and silicone demonstrated the most, while vinyl polysiloxane and gutta-percha resulted in the least.1 Although sealing with gutta-percha or vinyl polysiloxane decreased microleakage, it presented an obvious aesthetic compromise.

Using ceramic inlays for sealing implant-prosthesis screw access holes has been suggested as an aesthetic solution. Studies2 suggest that the use of ceramic inlays appears to be a predictable, aesthetic and successful method of sealing these holes, but this does not take into account the cumbersome process required to fabricate and deliver the ceramic inlay plugs. This makes the technique impractical in a clinical setting.

Organically modified ceramics (“ormocers”) represent a newer material category that may suit these types of procedures well. Ormocers have been well studied for years, but recently a nano-ormocer has been introduced for everyday use as a direct restorative material. While nano-ormocers look, feel and are placed like traditional composites, their extremely low shrinkage, super biocompatibility, and outstanding strength and aesthetics make them an ideal option for filling screw access holes. In our clinical examples we used VOCO’s Admira Fusion as our restorative material of choice. (It’s important to note that using a universal adhesive, such as VOCO’s Futurabond U, is favored to actually bond the material to the milled restoration.)
Case report No. 1

A 74-year-old patient presented for delivery of a screw-retained, implant-supported bridge in the mandibular premolar and incisor region. The original treatment plan consisted of strategic extraction and immediate implant placement in sites #21, #23, #25 and #27, to ultimately restore with an implant-supported bridge (Fig. 1). Three ADIN Touareg-S implants were immediately placed in sites #21, #23, #25 and #27, and the adjacent teeth were retained as abutments for a provisional bridge during the osseointegration phase. After osseointegration the implants were impressioned and a screw-retained, implant-supported Zirconia crown, Vita shade A3.5, was fabricated.

Local anesthesia was administered with 2 percent Xylocaine with 1:100,000 epinephrine. The remaining teeth were atraumatically extracted, and the implant-supported bridge was secured in place. Radiographs confirmed complete seating of the restoration (Fig. 2). The abutment screws were tightened and torqued to 30 Ncm. The screw-channel access hole emerged incisally in a visible area (Fig. 3).

The access hole was dried and packed with Teflon to protect the abutment screw (Fig. 4). Admira Fusion shade A3.5 was selected and placed in the screw-access channel over the Teflon (Fig. 5). The matrix was molded and trimmed while soft, then cured for 60 seconds. Once set, the restoration was polished with a rubber wheel. After polishing, the screw access hole entrance was no longer identifiable to the naked eye (Fig. 6). A highly aesthetic result was achieved.
Case report No. 2

A 55-year-old patient presented for an appointment to verify osseointegration of a previously placed immediate implant (ADIN Touareg-S 5x13mm) No. 3 (Fig. 7). Site No. 2 had previously been restored with an implant-supported, screw-retained PFM crown. The patient reported that he felt a “ditch” with his tongue on the back tooth; upon clinical examination, the access hole of No. 2, which had been filled with a single-curing composite resin, was deficient and discolored (Fig. 8).

The screw channel was washed and Teflon was placed to cover the abutment screw. Admira Fusion shade A3.5 was selected using VOCO shade tabs (Fig. 9) and placed into the screw access channel over the Teflon (Fig. 10). The restoration was molded and trimmed and cured for 60 seconds; once set, the restoration was polished, providing an aesthetic and functional seal (Fig. 11).

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Case report No. 3

A 67-year-old patient presented with hopeless teeth #23–26. The teeth were extracted and two ADIN Touareg-S implants were placed in sites #23 and #26 (Fig. 12). Once osseointegration had been confirmed, the implants were restored with a screw-retained, implant-supported zirconia bridge (Fig. 13). The screw access holes were sealed with a composite restoration.

When the patient presented for follow-up, he reported that the back of his bridge felt “rough, like something chipped,” and that it looked “like I have cavities on the back of the bridge.” The clinical exam revealed that the composite seal had chipped and was stained (Fig. 14).

The composite plug was removed with a round burr. Debris was visible in the access channel, indicating that micro- and macroleakage had occurred. The access channels were cleaned out and dried, and Teflon was placed to protect the abutment screws. Admira Fusion shade A3.5 was selected and placed into the screw access channel over the Teflon. The restoration was molded and trimmed, then cured for 60 seconds. Once set, the restoration was polished. The patient was satisfied with the functional and aesthetic result (Fig. 15).

Conclusion

Ormocers such as Admira Fusion may represent a new and viable option to seal screw access holes on implant restorations. Their strength and simplicity to place and polish should lead to many years of maintenance-free dentistry on the implant access hole.

References

Fig. 12: The preoperative radiograph shows severe bone loss in mandibular incisors and replacement with ADIN Touareg S implants.

Fig. 13: A milled zirconia screw-retained bridge in place.

Fig. 14: Discolored and defective composite sealing screw access holes.

Fig. 15: Access holes are sealed with Admira Fusion.