

Retrieval of Cement-Retained Implant-Supported Prosthesis Using a Custom Digital Abutment Screw Location Guide: A Novel Technique

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ABSTRACT:

Many strategies are being developed constantly to meet biological and technical obstacles in the rapidly developing field of dental implantology. In order to improve the accuracy and efficiency of locating the abutment screw access opening in cemented implant-supported restorations, this abstract presents the “Retrieval of Cement-Retained Implant-Supported Prosthesis Using a Custom Digital Abutment Screw Location Guide. Unlike traditional techniques, this novel method makes use of clear, patient-specific guides that offer visual assistance for precise precision, doing away with the need for intrusive procedures and guessing. This expedites the retrieval procedure while minimizing harm to the surrounding tissues, the abutment, and the implant. The approach not only increases accuracy but also improves patient comfort because it is customized to each patient's specific anatomy and implant placement. Its effectiveness shortens procedure times dramatically, which benefits patients and practitioners alike.

INTRODUCTION:

Implant-supported restorations can be secured to implants in two ways: they can be attached directly with screws (screw-retained), or they can be cemented to abutments (cement-retained).¹ Screw-retained prostheses offer the main advantage of retrievability in the event of screw loosening or fracture. They have demonstrated excellent marginal integrity and are particularly suitable for patients with limited interocclusal distance. However, they also have some disadvantages, including compromised esthetics, difficulty in establishing occlusion, and the potential for ceramic prosthesis fracture due to the presence of the screw access hole (SAH) on the occlusal surface.¹⁻³ In contrast, cement-retained prostheses provide easier fabrication, a more passive fit, lower cost, and better access in the posterior region. They can also compensate for malpositioned implants. This type of prosthesis eliminates the unesthetic SAH, resulting in a more esthetic ceramic restoration that is more resistant to chipping and fracture, with more precise occlusion. However, they are more challenging to retrieve, and removing excess cement can be demanding. But the retrieval of the cement retained prosthesis is more challenging in case of complications.¹⁻³ In literature there are various techniques available for retrieving and registering screw access hole (SAH) of cement-retained implant-supported prostheses.⁴ Some of them are use of additional screws by Clausen et al,⁵ lingual retrieval slot mechanism by Schweitzer et al,⁶ vacuum-formed, clear retaining-screw location guide was described by doer,⁷ silicone occlusal index by hill⁸ etc. This article describes a new and simpler technique that requires less time, is less technique sensitive. In this article we have demonstrated the digital technique for registering and retrieval of cement-retained implant-supported prostheses.

TECHNIQUE:

Step 1: Record intraoral scan of the implant with the final torqued abutments in place with intraoral scanner. (Fig.1)

Step 2: Record intraoral scan of the cemented prosthesis with intraoral scanner. (Fig.2)

Step 3: Use superimposition software to super-impose the above two scans to get a modified scan highlighting the screw access holes through the cemented prosthesis. (Fig.3)

Step 4: Use CAD software design a clear retainer with guiding holes on the superimposed scan highlighting the screw access holes. (Fig.5)

Step 5: Use 3D printer or CAM to make the designed guide. (Fig.6)

Step 6: Use the custom digital abutment screw location guide to highlight the screw access holes and drill through it for easy retrieval of prosthetic screw. (Fig.7)

DISCUSSION:

For implant-supported restorations, the clear retaining-screw position guide that is 3D printed offers a number of benefits. The accurate guidance streamlines the workflow from digital scanning and modelling to 3D printing, saving time by removing the need for repeated changes and trial-and-error techniques. The digital aspect of the process improves space efficiency by reducing the need for physical storage and enabling on-demand production to cut down on clutter. This technique's quick availability, tailored fit, and ease of replication demonstrate its accessibility and convenience by guaranteeing the guide is always ready for use with little to no lead time. However, there may be a learning curve for certain clinicians due to the technique's sensitivity and high level of precision and skill in digital modelling, CAD-CAM technology and 3D printing.

SUMMARY:

With digital methods that reduce the need for physical storage, the 3D printed clear retaining-screw location guide offers several benefits, including time and space efficiency. Its quick availability, adaptable fit, and simplicity of replication increase practicality and accessibility. These advantages make the guide a priceless tool for streamlining procedures and making cement-retained dental implant prostheses simple to remove without endangering the implant or abutment.

Declarations of Interest: None

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FIGURES:

Figure 1: Intraoral scan of the implant with the abutments in place.



Figure 2: Intraoral scan of the cemented prosthesis.



Figure 3: Use superimposition software super-impose the above two scans to get a modified scan highlighting the screw access holes through the cemented prosthesis.

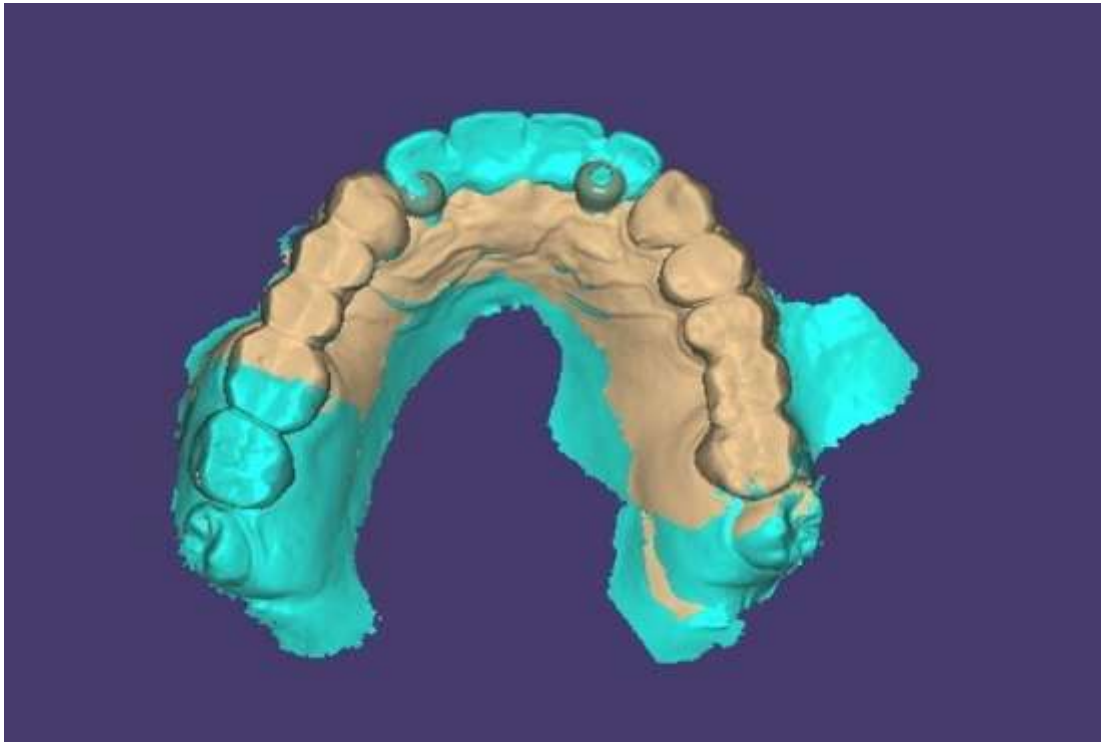


Figure 4: 3D printed cast of the modified scan highlighting the screw access holes through the cemented prosthesis



Figure 5: Use CAD software design a clear retainer with guiding holes on the superimposed scan highlighting the screw access hole position.

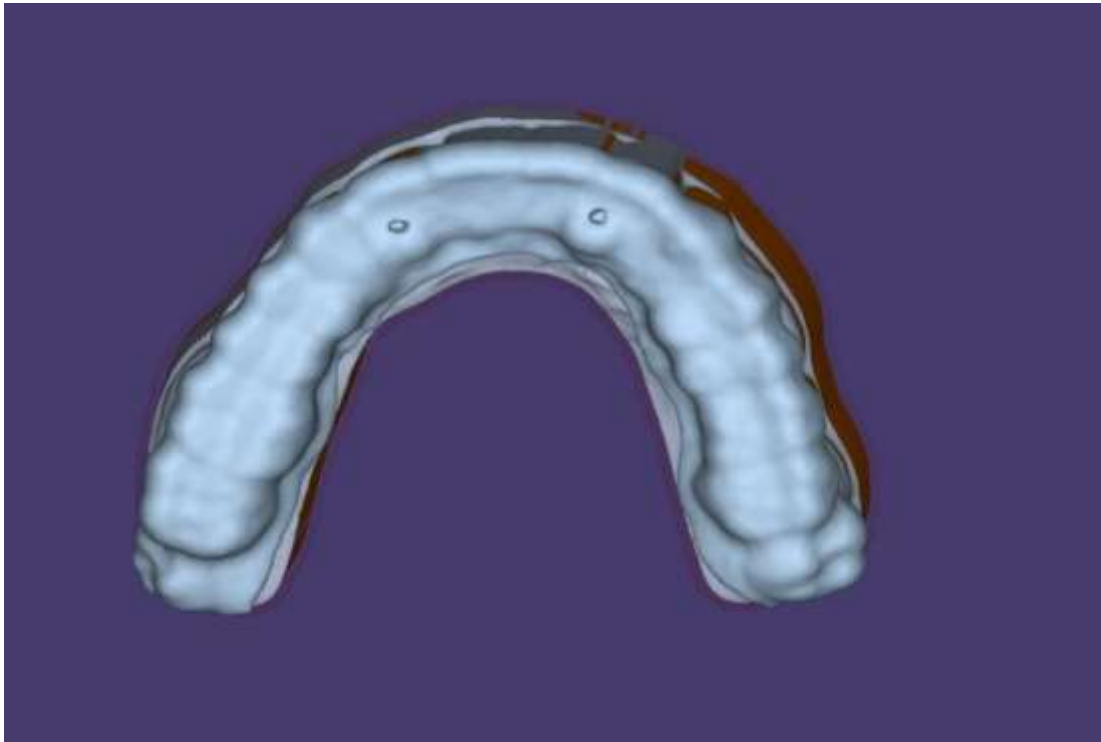


Figure 6: 3D printed clear retainer with access holes highlighting the screw access hole position.



Figure 7: Use the custom clear retainer to highlight the screw access holes and drill through it for easy retrieval of prosthetic screw.



Figure 8: Access hole made using the custom digital abutment screw location guide

