



A Digital Workflow to Improve Success of Implant Restorations

Desigar Moodley, PhD, Stephan Lampl, MSc MDT, Frederic Sakete, MSc, Marco Tudts, DDS, MScD

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Title: "Digitaler Workflow zur Erfolgssteigerung von Implantatversorgungen"

Introduction

It's only until recently when analog procedures were used to plan and restore implants. Although digital technology has replaced these methods with success, they lacked critical restorative CAD/CAM solutions for implant supported restorations. Most CAD/CAM blocks do not have a screw hole built into the block itself. A ready-made implant screw hole allows the software to design the restoration around this screw hole allowing for ease of restoration placement and proper mucosal contour around the restoration. Having a ready-made screw hole provides the clinician with several advantages including time and cost saving.

Currently on the market, a few companies provide CAD/CAM blocks with a built-in implant screw hole but with several disadvantages. edelweiss dentistry, a company at the forefront of laser sintering hybrid glass technology, has recently introduced the i-BLOCK (implant Block) meeting the demands of both strength and esthetics necessary for implant restorations (figure 1a and b).

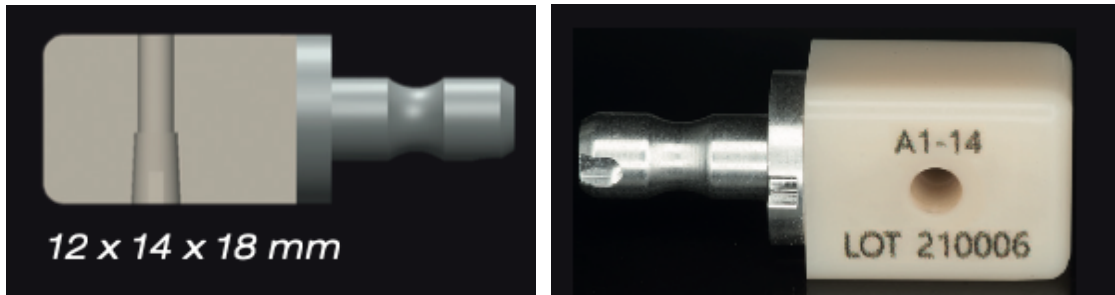


Figure 1a and b. edelweiss i-BLOCK with built in screw hole to fit precisely to titanium base (Ti-Base).

The edelweiss i-BLOCK consists of silica and barium glass fused as a single glass phase for very high esthetics, aluminum oxide for high strength (320 MPa), surface hardness of 100 HV for good wear resistance and a modulus of elasticity of 20 GPa giving it a shock absorbing effect protecting both the implant and its surrounding tissues¹.

For immediate loading, it is important to have a modulus of elasticity similar to dentin as is the case with edelweiss i-BLOCK. It also contains zinc oxide nanoparticles and fluoride for antibacterial properties, a unique feature of the i-BLOCK that will help maintain a healthy mucosal seal. Precision manufacturing processes guarantee the new edelweiss i-BLOCKS with its built-in screw hole to fit precisely onto Titanium Base (Ti-Base) so that the final restoration can be placed in the same appointment, reducing treatment sessions and improving the patient experience.

The edelweiss i-BLOCK allows for 2 digital workflow solutions. It can be used as a single unit screw retained single abutment crown or as a mesostructure (abutment) and final crown as two units (figure 2a and b).



Figure 2a and b. Screw retained crown as a single unit and mesostructure (abutment) and crown as two units.

Case report

Following successful implant osseointegration for missing 12, the healing abutment was removed (figure 3). A titanium base cylinder was placed on the lab analog and then scanned. Once the full contour tooth was designed, the two files were then split into: one for the mesostructure (abutment) and one for the overlying crown. The screw hole of the block could be easily visualized and the design adjusted to allow for the screw hole to not be on the incisal edge using the parameters as shown in figure 4.

The crown margin was adjusted to offer a tissue-level cement junction compared to subgingival location of the cement junction seen in a typical stock abutment. Once milled the attached point (screw) was removed with a diamond bur. The final edelweiss restoration simply requires a linen wheel for final polishing.

The mesostructure abutment was attached extra-orally to the titanium base using Calibra Ceram (Dentsply Sirona) and then screwed onto the implant intra-orally (figure 5 & 6). The edelweiss final crown, being a single glass phase, showed optimal esthetics and a perfect final color match (figure 7).

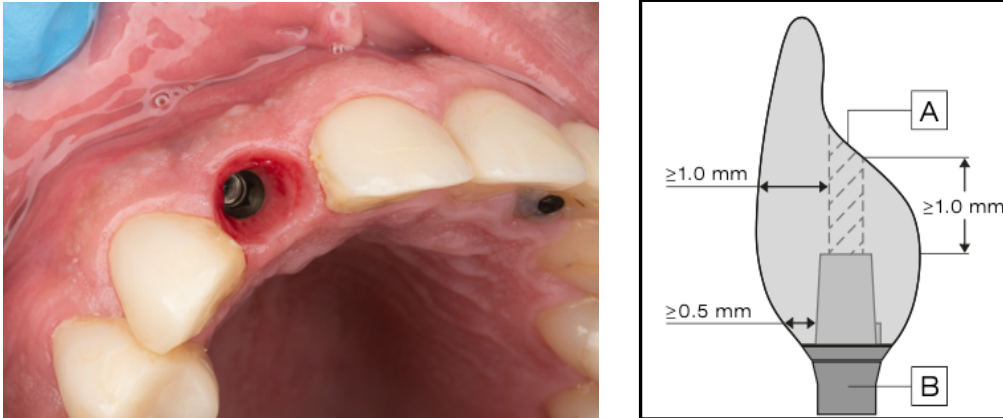


Figure 3. Removal of healing abutment showing good healing of mucosal tissue.

Figure 4. Parameters used during milling to ensure sufficient thickness around screw hole (A: screw hole; B: titanium base)

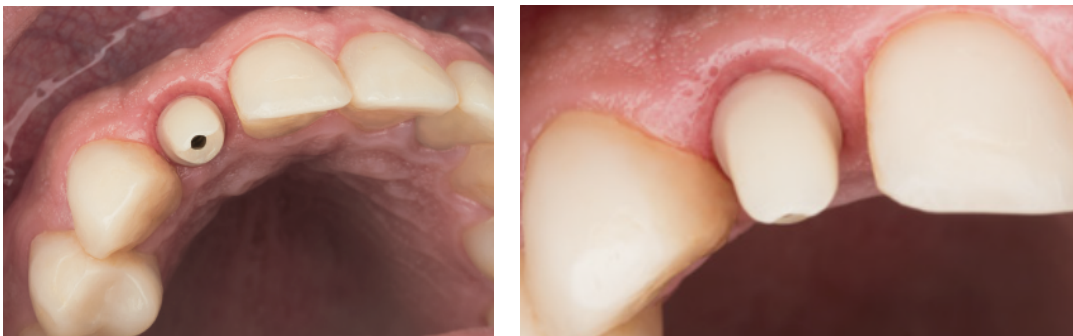


Figure 5. Mesostructure is first cemented to titanium base extra-orally. The crown was placed onto the mesostructured to confirm fit.

Figure 6. Abutment cemented onto titanium base and screwed onto the implant.



Figure 7. Final edelweiss implant restoration having the natural esthetics blending in with the surrounding environment.

Conclusion

The edelweiss i-BLOCK provides a simple and easy solution for implant restorations. Patient-specific soft tissue management that conforms precisely to the patient's gingival contours, makes them an excellent biologic and esthetic option for implant treatment. The edelweiss i-BLOCK custom abutment ensures a perfect esthetically driven emergence profile and a biologically driven mucosal seal.

More information about edelweiss dentistry



Authors

1. Dr. Moodley D. (PhD; MSc-Restorative; PDD-Esthetic Dent; BDS; FICD)
Smile & Education Centre, Wolfurt, Austria.
2. Dr. Lampl S. (MSc-Esthetic & Restorative Dent; BDS; MDT; BBA)
Smile Centre & SkinMed, Gardens, Cape Town, South Africa.
3. Dr. Sakete F. (MSc-Implantology & Oral Surgery; BDS)
Wasgau Straße 2, Frankfurt Main, Germany.
4. Dr. Tudts M. (DDS, MScD)
Cosmident, Lier, Belgium.

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