

Customised PEEK healing caps and impression posts: revolutionising the workflow in implant treatment

Today, the question is not whether dental implants are osseointegrated, but the “where” and the “how” we can optimise the ecosystem to incrementally improve patient outcomes. Preserving the structure of the peri-implant tissue, increasing patient comfort, reducing morbidity, and shortening treatment times are all examples of hot topics within state-of-the-art research and development. Camlog has established a new workflow in implant therapy with its DEDICAM services using customised anti-rotation PEEK healing caps and PEEK impression posts based on patient-specific emergence profiles, all produced from a single data set obtained during the CAD/CAM process.

The customised PEEK healing caps and PEEK impression posts—identical in subgingival design—support pre-, intra- and postoperative procedures for shaping the peri-implant soft tissue and transferring the anatomy. The tissue-friendly PEEK material and the optimised anatomical emergence profiles offer two distinct clinical advantages—no additional soft-tissue manipulation is required, and the obtained profile can be transferred to the master cast in a precise manner.

The integration of digital processes in the dental practice and laboratory, with their choice of individual parameters, makes for efficient and patient-friendly concepts. Digital workflows can be adapted to the local infrastructure as well as the requirements of the treatment team. Individually designed and manufactured implant components ensure ideal conditions for

custom prosthetic restorations in conjunction with 3D X-ray diagnostics, virtual 3D implant planning, intra-oral scanning, and template-guided implant placement.

Customisation as a concept covers not only individual treatment planning but also any prosthetic component that can be customised and precisely manufactured using CAD/CAM technology.

Customised PEEK healing caps and impression posts for Camlog and BioHorizons implants

Customised PEEK healing caps and PEEK impression posts are available for the CAMLOG, CONELOG, iSy, CERALOG and BioHorizons implant systems. Each are CAD/CAM milled with a maximum diameter of 10 mm, a process that requires a sound knowledge of polymer processing and quality assurance. PEEK has been used routinely in implant therapy for many years, mainly for temporary restorations. The PEEK healing caps, which are approved for an intra-oral presence of up to 180 days, can be ordered individually or as a set with an impression post for use in open- or closed-tray

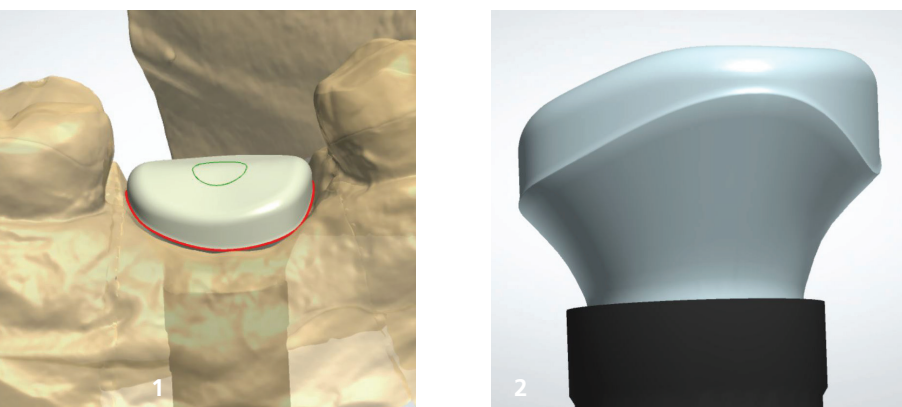


Fig. 1: Anatomical design of the healing cap defining the emergence profile of the crown (note concavity in the submucosal region). **Fig. 2:** Design of the customised healing cap based on backward planning at the time of implant exposure.

impression technique. With libraries provided for 3Shape, exocad and Dental Wings CAD software, registered DEDICAM customers can design their own customised healing caps and have them manufactured to order from Camlog. The same data set can then be used to produce a customised impression post in the same procedure. To simplify the intra-oral alignment of the customised components it is recommended to apply a visual marker in the form of a small depression on the healing cap, a marker that is later transferred to the impression post.

A flexible workflow using backward planning

Digital workflow: Using the DEDICAM Implant Planning Service; the anatomical emergence profile, the design of the subgingival aspect for optimum tissue support, and the proper height of the healing cap are defined. The surgical guide and the healing cap—and, if desired, the impression post—can be ordered from Camlog. Alternatively, an export of the planning data can be sent to the dental laboratory. Once the guided surgery has been completed, the healing cap can be connected directly as part of a single-stage procedure for immediate restoration, thanks to the precise position and alignment of the internal implant configuration. The healing cap is left uncovered, shaping the soft tissue anatomically based on the emergence profile.

If submerged healing is preferred, the healing cap is placed after re-entry. When required, the soft-tissue volume can be increased by raising a tubed flap. Once the soft tissue has healed as supported by the healing cap, the identical design can be used for the final abutment to ensure continued soft-tissue support (if the healing cap was designed at the dental laboratory). For any changes that might be required, the current soft-tissue status can be recorded by an intra-oral scan, starting from the implant shoulder.

Moreover, for complex rehabilitations with fixed implant-supported multi-unit restorations, analogue impressions using PEEK impression posts have proven beneficial for our customers.

Partially digital workflow: This workflow emerges as the result of a collaboration between the oral surgeon, the prosthodontist and the dental technician. The oral surgeon places the implants as previously agreed with the prosthodontist, scanning their positions before submerged healing begins. At re-entry, the customised healing caps are connected to create the desired anatomical shape of the peri-implant soft tissue. This is also the procedure chosen for the case study by Dr Peter Randelzhofer that is presented here.

Once the tissue has healed, the restorative procedure can be initiated at the referring dentist's office, who will encounter a perfectly formed mucosa. Its shape can be transferred to the laboratory in an analogue impression procedure with the help of the custom impression posts that required no additional effort to obtain. The restoration can then be fabricated in an analogue or digital process, depending on the dental technician's preference.



Fig. 3: Connection of the customised PEEK healing cap after re-entry. It remained *in situ* for four weeks to shape the soft tissue. **Fig. 4:** Anatomically shaped and firmly attached mucosa at the time of impression-taking. **Fig. 5:** The impression post—congruent in shape in the submucosal area—is used to transfer the implant position and emergence profile to the master cast without causing the soft tissue to collapse or otherwise manipulating the gingiva in any way.

Outsourcing: Part of the process can be outsourced to a production centre in a mixed analogue/digital process, where the implant dentist takes an implant impression or performs an intra-operative intra-oral scan of the implant position. Either the casts or the scan data are transmitted to Camlog together with a situation model and a scan of the opposing jaw. The experienced



Fig. 6: The emergence profile of the hybrid abutment corresponds to the design of the healing cap. **Fig. 7:** The definitive restoration is delivered three months after re-entry, avoiding any pressure on displacement of the soft tissue. **Fig. 8:** The final restoration. The peri-implant mucosa is stable and anatomically shaped.

dental technicians at the DEDICAM service centre design the patient-specific healing caps in consultation with the dentist and transmit the manufacturing order for healing caps and impression posts to the production centre. Both are manufactured to high precision and returned to the practice in order to create optimum clinical conditions for the development of an anatomically shaped mucosa.

Conclusion

Customised PEEK healing caps and impression posts render the workflow flexible and convenient for all stakeholders. The virtually designed patient-specific emergence profile is safely under control, from the time of implant placement until the delivery of the definitive restoration. There is no need to manipulate the soft tissue, as would be the case after removing a standard healing abutment. Having an impression post with an identical emergence profile replicated from the same data set—prevents the mucosa from collapsing and allows the soft-tissue profile to be transferred for the fabrication of an identically shaped abutment. This patient-friendly treatment concept is characterised by ease of handling, predictable results, reduced pain and fewer treatment steps and appointments.

PEEK is a tissue-friendly material that has become established in implant therapy for temporary restorations.¹⁻³ An anatomically designed emergence profile creates the basis for the natural red-white aesthetics of the implant reconstruction, in addition to optimising the mucosa and protecting the alveolar bone. Customised healing caps and impression posts are time- and cost-efficient and a valuable aspect of a patient-friendly treatment concept.

DEDICAM services are available in selected countries. Please contact your local BioHorizons Camlog representative for more information.

All clinical photographs courtesy of Dr Peter Randelzhofer, Munich, Germany.

Literature



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