

Fig. 1: Exposure of the bone defect with a mucosal flap.

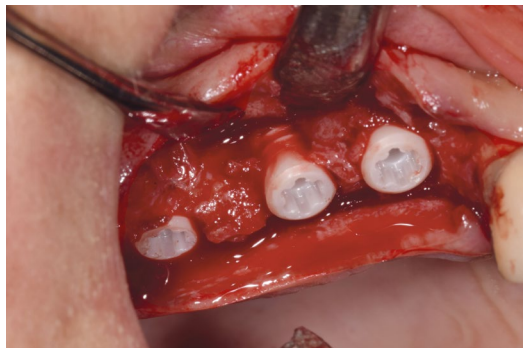


Fig. 2: Inserted CERALOG® Hexalobe ceramic implants in regio 16, 14 and 13 with buccal fenestration in regio 14.

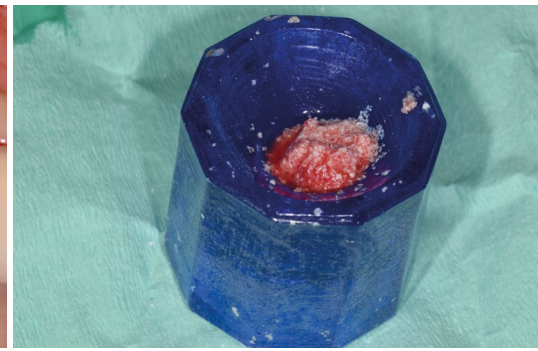


Fig. 3: Mixing the bone augmentation material MinerOss®-X with autologous bone chips and autologous blood of the patient.



INSERTION OF TWO-PIECE CERAMIC IMPLANTS WITH SIMULTANEOUS GBR – A SUCCESSFUL PROCEDURE WITH COORDINATED COMPONENTS

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Edentulous gaps in older patients are usually associated with atrophied alveolar ridges. In such cases, bone augmentation measures are usually required in order to align the implants correctly for the prosthesis and thus maintain function and esthetics over the long term. Membrane-protected Guided Bone Regeneration (GBR) is an extensively documented procedure for the restoration of sufficient and stable bone volume [1,3]. Inorganic alloplastic granules such as MinerOss®-X and resorbable membranes such as Mem LOK Pliable (both BioHorizons from CAMLOG, Wimsheim) have a proven track record and are the clinical standard.

Implant prosthetic restorations with ceramic implants require a strictly planned and considered procedure in all respects. This applies not only to the selection of a suitable implant system but also to the use of a suitably matched material for bone augmentation. Only an augmentation material with an absorption rate more or less equal to bone growth results in the desired bone regeneration by essentially degrading completely, allowing newly formed bone to attach to the implant surface and produce the necessary BIC. The augmentation material is stabilized with an absorbable barrier membrane.

The bone augmentation material MinerOss®-X from BioHorizons (CAMLOG, Wimsheim) is extracted from bovine bone and has a mineral structure similar to that of human hard

tissue. During the production process, all protein structures are removed, leaving behind a de-proteinized inorganic matrix with no cellular or organic components. The resulting hydroxyapatite skeleton has a purely osteoconductive effect. As the formation of new bone is linked to blood vessels, endothelial cells and pre-osteoblasts can grow or revascularize into the framework from adjacent tissue (angiogenesis and ossification).

Implantation with simultaneous GBR

The atrophied bone is exposed using a mucoperiosteal flap and the implantation is performed according to the protocol. Three CERALOG® Hexalobe ceramic implants, each with a diameter of 4 mm, were placed subgingivally in regions 16, 14 and 13 at 12–30 Ncm. The two-piece

ceramic implant has a reduced roughness in the neck area of 0.5 µm RA compared to the endosteal area with a roughness of 1.6 µm RA. This optimizes attachment of peri-implant soft tissue and bone cells. Before filling with the bone augmentation material MinerOss®-X, the implants are covered with a cover cap for submerged healing.

In order to fill the buccal bone deficit, MinerOss®-X cancellous bone granules are mixed with autologous bone chips extracted from the drilled shafts as well as with the patient's blood. In order to promote optimal ossification, the bone augmentation material should only be applied in direct contact to well-vascularized bone. The membrane for covering the augmentation material is first inserted from the palatal side. (**Figs. 1 to 6**)

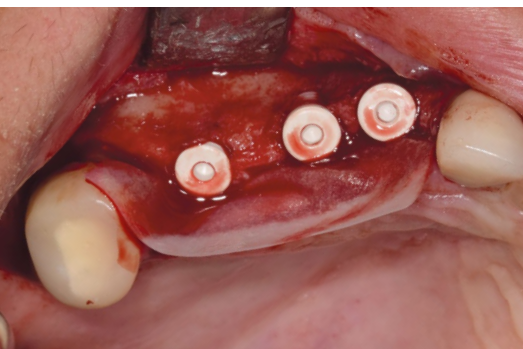


Fig. 4: Insertion of the Mem-Lok® Pliable membrane.



Fig. 5: The bone mixture is easy to handle.

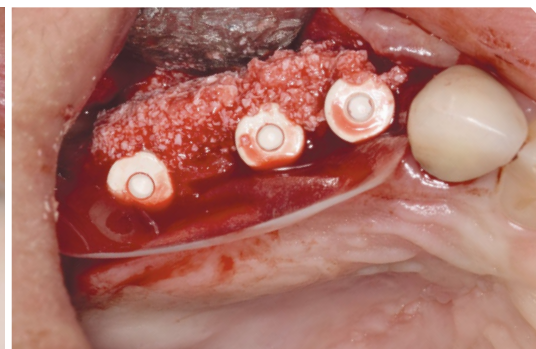


Fig. 6: Filling of the defect with the mixed MinerOss®-X.

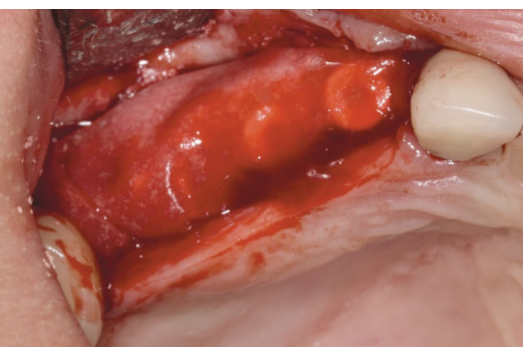


Fig. 7: Cover the augmentation material with the previously inserted Mem-Lok® Pliable barrier membrane.

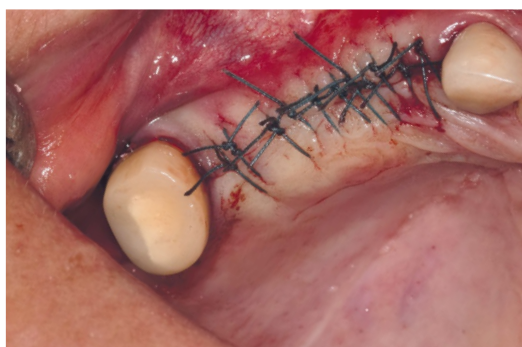


Fig. 8: Suture the mucoperiosteal flap without too much pressure.



Fig. 9: Peri-implant soft tissue healed without complications over the augmentation area.

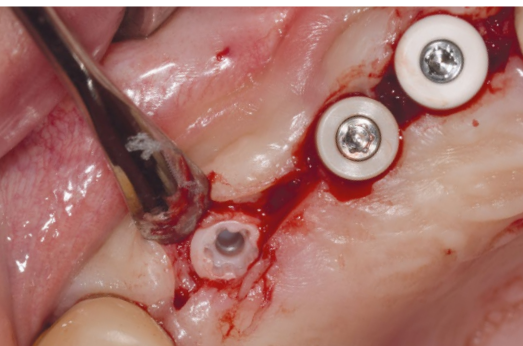


Fig. 10: Re-entry after four months with complete bone remodeling.



Fig. 11: Using single button sutures, the soft tissue is adapted closely to the healing caps.

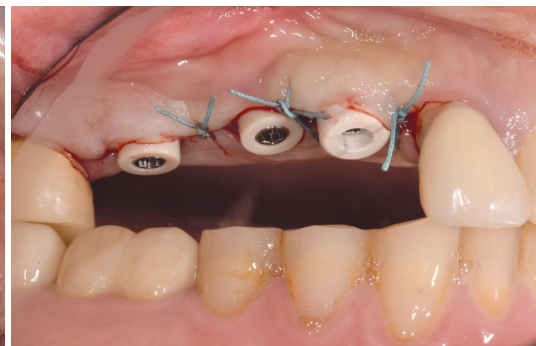


Fig. 12: Sutured peri-implant mucosa at the healing caps.

Covering with membrane

The pliable, non-side-specific Mem-Lok® Pliable membrane is a native collagen membrane made from high purity porcine tissue. It separates the rapidly proliferating soft tissue from the graft and the slower regenerating hard tissue. With a resorption time of 12 to 16 weeks, the membrane corresponds to the period of angiogenesis and ossification. As it is highly tear resistant, the membrane can be easily sutured over the defect. One should not exert too much

pressure on the flap, because this can lead to an unwanted migration of graft particles into the surrounding tissue [2]. **(Figs. 7 to 8)**

Re-Entry

The healing time in the presented case was approximately four months. The peri-implant soft tissue over the augmentation area was healed completely without irritation and without dehiscence. At exposure, bone remodeling was observed

beyond the implant shoulder in parts. The X-ray showed a complete conversion of the granules to newly formed bone with a stable structure. The healing caps could be inserted and the patient was referred to her family dentist for impression taking and further prosthetic treatment. The implant in regio 13 was restored with an individual zirconium abutment, the two implants in regio 14 and 16 with corresponding PEKK abutments. Divergences that develop between the implant and crown axes can be compensated for easily by the two-piece



Fig. 14: Hexalobe PEEK impression post for open impression taking (with fixing screw).

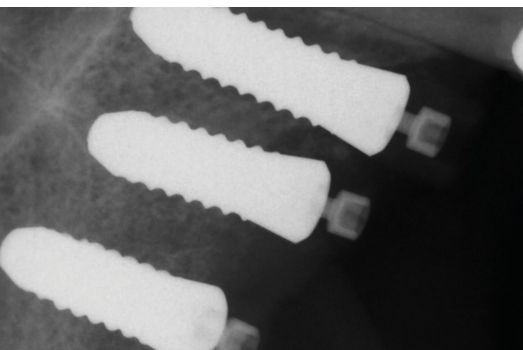


Fig. 13: X-ray after four months of healing with complete bone remodeling.

CERALOG® Hexalobe ceramic implants with appropriately customized PEKK abutments (polyether ketone ketone). The ductility of the PEKK abutments, which resembles that of natural teeth, also reduces the stress factor on the ceramic implant. The prosthetic restoration was performed by the family dentist Dr. Peter Pangert, the dental work by dental technician MDT Thomas Blochberger, saalezahn - Dentaltechnik GmbH (both Rudolstadt). (Figs. 9 to 14)

Summary

The insertion of ceramic implants often appears to be problematic in atrophied alveolar ridges. However, GBR performed simultaneously with the implantation using xenogeneic KEM, for example, MinerOss®-X and membrane, can produce a bone bed with adequate volume. MinerOss®-X demonstrated a very good osteoconductive effect. Covering with the Mem-Lok® Pliable barrier membrane keeps the augmented area stable during the remodeling phase and prevents migration of the bone augmentation material. The augmentation requires tight wound closure which can only be sufficiently secured using a two-piece implant

system. The rough implant surface of the CERALOG® Hexalobe ceramic implants in the endosseous region supports the apposition of the newly formed bone, while in the supracrestal region the peri-implant soft tissue can attach to the smooth surface of the implant neck.

The surgical result shows that proven surgical concepts, which are sufficiently well documented for titanium implants, can also be applied successfully to ceramic implants.

You can read about the procedure of the prosthetic restoration of the unilateral free-end situation with the CERALOG® Implant System in the next issue of logo.

LITERATURE

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Dr. Alexander Volkmann studied dentistry at the Friedrich Schiller University in Jena from 2000 to 2005. After obtaining his licence as a dentist, he worked as a preparation assistant in the dental practice of Dr. Astrid Volkmann-Schmidt in Ebersdorf, Thuringia, until 2007 and received his doctorate in dentistry from the University of Jena. Until 2010, he worked as an advanced training assistant in the oral and maxillofacial surgery joint practice of Dr. Reuter and Dr. Wiegner in Saalfeld, where he specialized in implant dentistry. In 2010, he set up his own practice in Eisenach as a specialist dentist for oral surgery. This was followed in 2012 by the founding of the saalezahn practice in Jena with Dr. Reuter. In 2014, the two practices in Jena and Eisenach were renamed FACELOOK CONCEPT. Functioning solely as referral practice, the concept covers oral and maxillofacial surgery, oral surgery, implant dentistry, dermatosurgery, laser therapy, plastic esthetic facial surgery, and outpatient 3D diagnostics.

Dr. Alexander Volkmann is a member of the following associations: MVZI, DGI, DGZMK, FvZ