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Regenerative Medicine

The specific case

Delayed immediate implant placement and direct soft-tissue management with **CERASORB® Foam** and **I/A-PRF**.

CERASORB® Foam.

CERASORB®.
Keeps its words in bone regeneration.

Dr. med. dent. Haki Tekyatan
Dentist, specialist in implantology,
periodontology and oral surgery

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Delayed immediate implant placement and direct soft-tissue management with **CERASORB® Foam** and **I/A-PRF***

"In the case of implant planning, the preservation of soft tissue and bone is essential for functional and aesthetic long-term success. The timing of implant insertion and soft-tissue shaping play a crucial role, as do the measures taken in advance of the planned therapy. A targeted strategy can generate favourable conditions before implant placement. In this context, the use of synthetic bone grafting materials, such as CERASORB® Foam in combination with autologous platelet concentrates (I-PRF and A-PRF) has become increasingly important in recent years.

With the "biologisation" of bone grafting materials for alveolar management, stable preservation of the extraction socket and the bone can be expected while promoting wound healing."

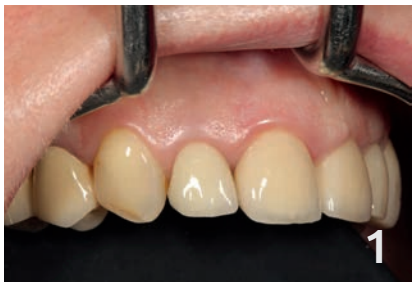
Dr. med. dent. Haki Tekyatan

Dentist, specialist in oral surgery, implantology and periodontology

* I-PRF = Injectable Platelet Rich Fibrin
A-PRF = Advanced Platelet Rich Fibrin

Case Report

A healthy 55-year-old female patient presented to the practice with an unsalvageable tooth #12. Clinically, the oral situation was unremarkable. The patient reported that the crown was loose and that it rotated slightly. She also reported pain on biting. The radiographic evaluation revealed that the tooth had been endodontically treated and restored with a metal post. Dislocation of the post and core with the crown and a deep fracture were detected, and the patient was informed accordingly (Figs. 1 & 2).



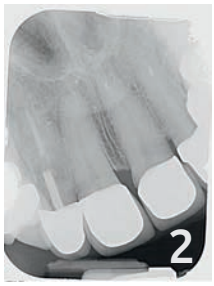


Fig. 2: Radiograph of tooth #12 showing failed endodontic treatment with the dislocated post.

Fig. 1: Initial clinical situation of tooth #12.

A few days later, tooth #12 was extracted gently and atraumatically with the aim of preserving the alveolar walls as far as possible. Special periotomes and instruments (KLACK set, Geistlich Biomaterials) were used for this purpose (Figs. 3 & 4).

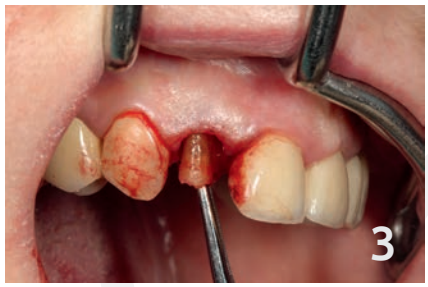


Fig. 3: Gentle detachment of marginal gingiva and periodontal ligament fibres using periotomes.

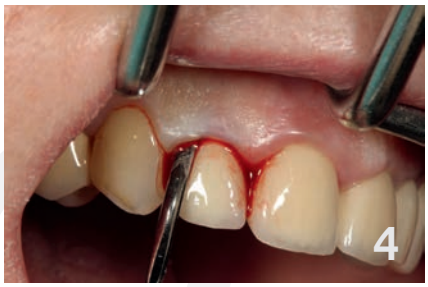


Fig. 4: Atraumatic extraction of the tooth and the fractured fragment.

Since an implant restoration was planned in this case, it was decided in advance, and together with the patient, that appropriate measures for bone preservation should be taken. The condition of the alveolus after extraction is an important criterion for deciding which treatment protocol should be used, that is, which bone grafting material with which resorptive properties should be used and when the implants should be placed. In the case described here, the alveolar bone could be preserved in all directions.

The decision was made in favour of delayed immediate implant placement and the use of a bone regeneration material that is rapidly resorbed and quickly incorporated into the autogenous bone.

Socket preservation was performed with a β-tricalcium phosphate collagen matrix (CERASORB® Foam), which was biologised in advance with I-PRF (platelet-rich fibrin concentrate; Fig. 5).

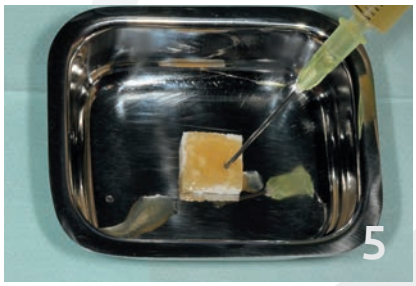


Fig. 5: Biologisation of the β-tricalcium phosphate collagen matrix CERASORB® Foam with I-PRF.

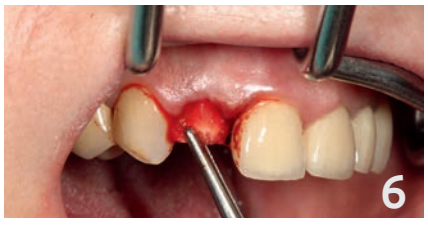


Fig. 6: Insertion of the biologised CERASORB® Foam into the extraction socket.

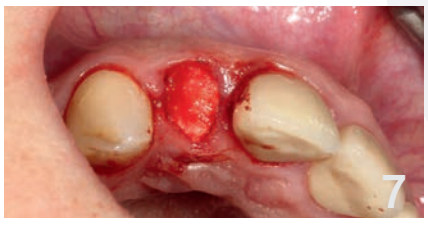


Fig. 7: Gentle adaptation of the easily mouldable CERASORB® Foam to the alveolar walls with slight material compression.

In its hydrated, biologised state, the collagen matrix can be excellently shaped and adapted to the alveolar walls with slight material compression (Figs. 6 & 7).

The augmentation site was covered crestally and sealed with a compressed A-PRF plug (Fig. 8). The site was then stabilised by means of cross-suturing (Fig. 9). Tight covering using the socket seal approach and a tissue punch was not necessary in this context. The gap was temporarily restored with an interim prosthesis, which was designed as a pontic in order to shape the soft tissue (Fig. 10).

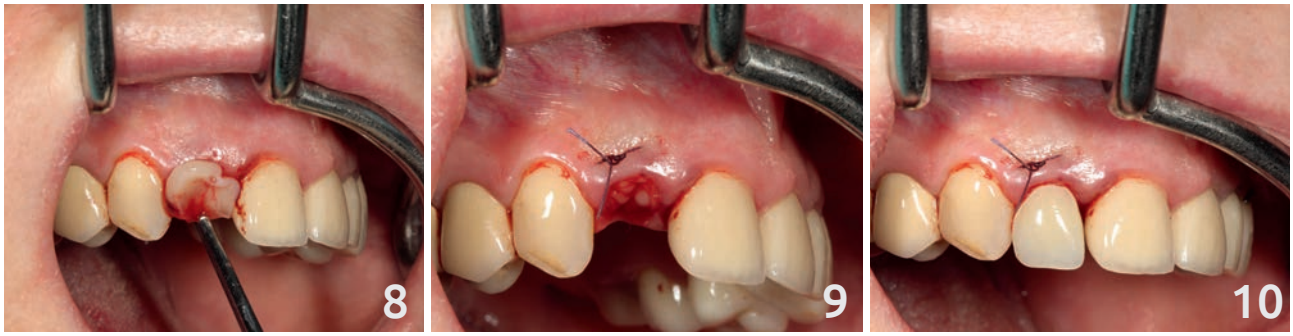


Fig. 8: Crestal covering and sealing of the augmentation material using a compressed A-PRF plug.

Fig. 9: Stabilisation and fixation by means of cross-suturing.

Fig. 10: Temporary restoration of the gap with an interim prosthesis.

Lastly, a control radiograph was taken, and the optimal defect filling and almost structurally identical distribution of the matrix could be noted on the radiograph (Fig. 11). After the treatment, irritation-free, stable and, above all, pain-free healing was observed. As a result, planning for implant placement by means of CBCT (Orthophos XG 3D, Dentsply Sirona) could be carried out after only three weeks (Figs. 12 & 13).

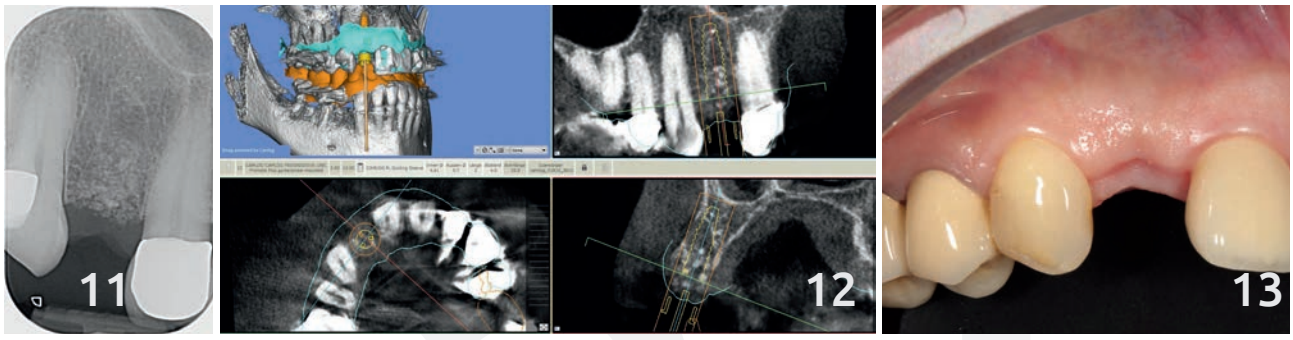
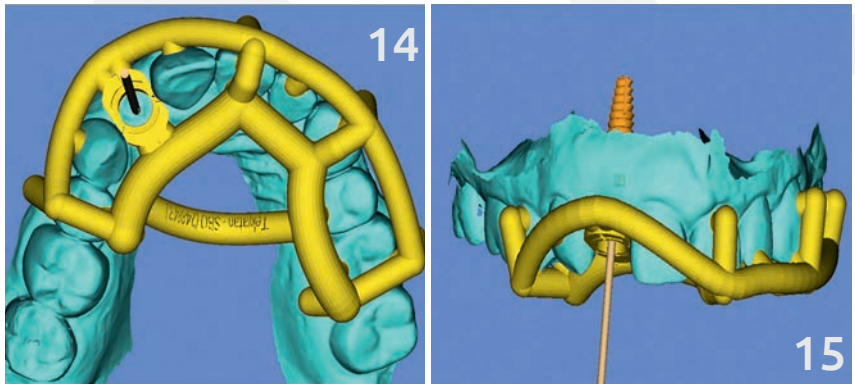


Fig. 11: Radiographic control of the augmentation site. Note the almost structurally identical distribution of the bone grafting material throughout the extraction socket.

Fig 12: Evaluation of 3D diagnostics showed sufficient stable bony conditions in all directions.
Fig 13: Clinical situation before implant placement.

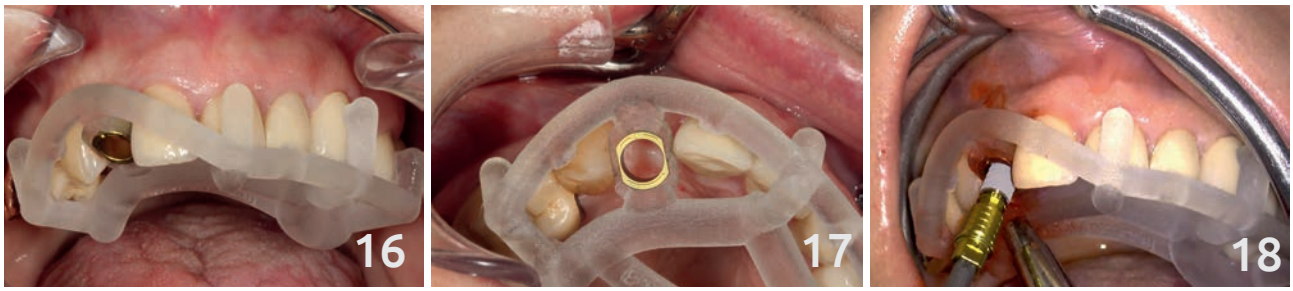
To achieve optimal 3D axial positioning of the implant in the vertical, mesiodistal and oro-vestibular directions, the CBCT/DICOM data sets were sent to an external planning centre (DEDICAM) via a secure channel and a surgical guide (CAMLOG® Guide, SMOP®, Swissmeda) was fabricated (Figs. 14 & 15).



Figs. 14 & 15: Planning of the surgical guide (CAMLOG Guide), vertical and ventral views.

An implant (CAMLOG PROGRESSIVE-LINE, Camlog; diameter: 3.8 mm; length: 13.0 mm) was chosen which would ensure sufficient high primary stability owing to its progressive thread design.

Six weeks after extraction and socket preservation, implant insertion in region #12 was performed under local anaesthesia. A crestal incision was made, and a flap was reflected in a minimally invasive manner. The surgical guide was put into position, and then the guide system and the 3.8 mm drill set (Camlog) were used to prepare the osteotomy in several steps to the planned length of 13 mm. Finally, guided implant placement was performed to a torque of 25 N cm (Figs. 16–18).



Figs. 16 – 18: Ventral and crestal views of the inserted surgical guide and guided implant placement in region #12.

After final positioning of the implant (Fig. 19), the insertion post was removed and a PEEK scan body (Camlog) with the same diameter of the implant (3.8 mm) was inserted (Fig. 20).

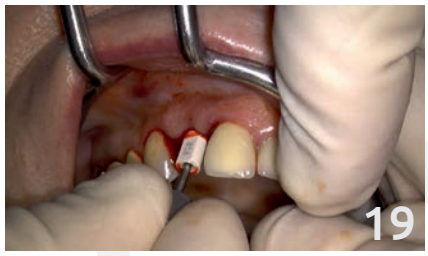


Fig. 19: Final position of the implant in region #12.

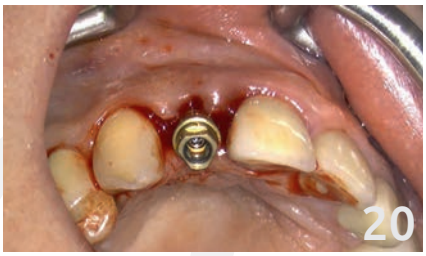
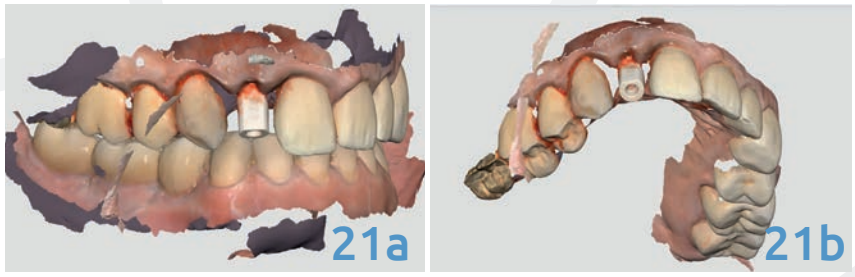


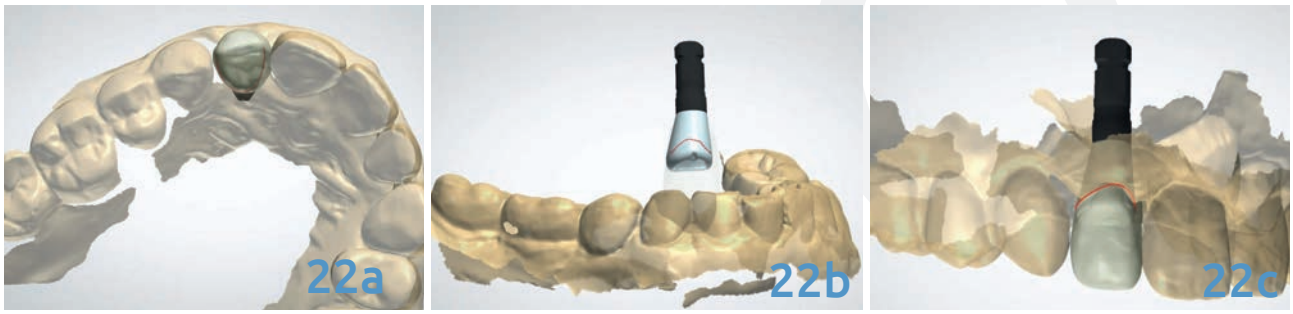
Fig. 20: Insertion of the PEEK scan body.

The implant and the jaws were then scanned intra-operatively (Medit i500® and Medit Link® software, Medit) to verify the position of the inserted implant (Fig. 21a–b).



Figs. 21 a & b: Determination of the final implant position by means of intra-oral 3D scanning.

After scanning, the scan body was removed, the healing abutment was installed, the surgical site was tightly sutured for submerged healing and a dental panoramic tomogram (Orthophos XG 3D) was taken (Fig. 22a,b,c). During the healing phase of the implant, the scans were further processed for further planning (Fig. 23).



Figs. 22a – c: Different views: buccal view (a), vertical view (b), maxilla segmented on to the planned restoration (c). The emergence profile of the healing abutment was matched to a virtual crown and designed accordingly (3Shape CAD software).

The objective was to shape the soft tissue and to fabricate the defini tive restoration in as few steps and as effectively as possible. Experience has shown that it is important to minimise insertion and extraction torque in order to protect and stabilise the peri-implant hard and soft tissue. This is essential for achieving long-term implant success, which, in the present case, was realised on the basis of the treatment protocol followed.

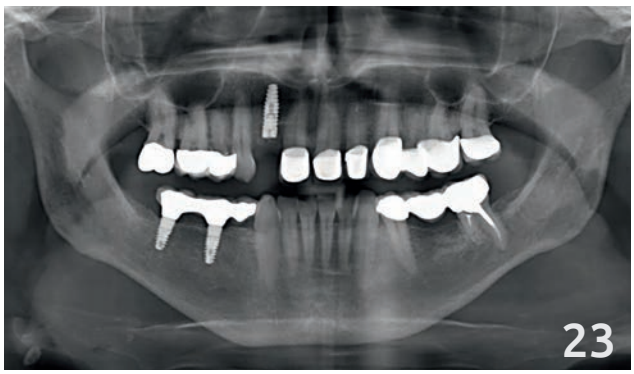
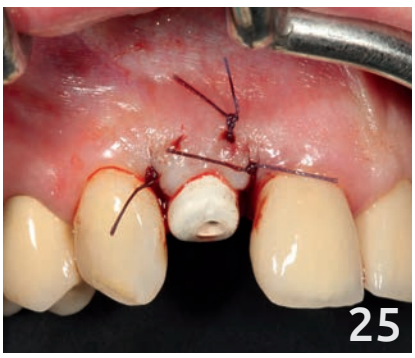


Fig. 23: Dental panoramic tomogram after implant placement in region #12 and post-op control at three months.

Fig. 24: Healing abutment made of PEEK.

After an irritation-free healing phase of three months, the hard- and soft-tissue conditions were considered stable, and therefore the implant was exposed under local anaesthesia. Since the soft-tissue situation was considered quantitatively sufficient, the incision was made crestally. In collaboration with the external planning service centre (DEDICAM), a novel healing abutment was fabricated from PEEK during the healing phase and subsequently inserted. This one-piece healing abutment does not require further processing, thereby minimising possible sources of error and potential contamination (Fig. 24).

The soft tissue was modelled in the coronal direction by means of a suspension suture, and the wound margins were fixed to the adjacent teeth by means of vertically modified backsuture (Fig. 25). Finally, a control radiograph was taken, and the interim pro thesis was adapted to the new situation (Fig. 26). With the customised healing abutment and the corresponding emergence profile, the soft tissue was entirely shaped within three weeks, and within the healing period. No further treatment steps, impressions or other measures were necessary. Not only is the treatment protocol shortened in this way, but the soft tissue is also protected from stress. The healing abutment is not radiopaque; thus, its position cannot be checked on radiographs at present. However, the correct position of the fixation screw is clearly visible. In this case, the focus was on the implant itself, the bone and tissue regeneration, and the control of the healing of the implant site after three months. There was homogeneous and continuous bony healing of the implant site throughout (Fig. 26).



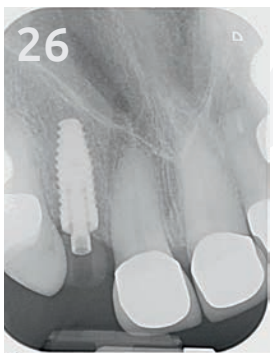
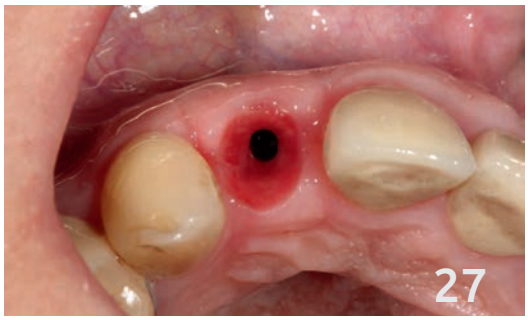


Fig. 25: Inserted individual healing abutment and fixation of the peri-implant mucosa.

Fig. 26: Periapical radiograph for radiographic control of the implant in region #12.

After a healing period of nearly three months, the definitive restoration of the implant in region #12 was carried out. A fully veneered zirconia crown was fabricated in a CAD/CAM procedure. The customised zirconia abutment was bonded to the titanium base. The crown was then cemented onto the abutment. Following the final restoration, a final radiographic control was taken. Since the crown was placed immediately after customisation, further aesthetic remodelling of the approximal peri-implant mucosa is to be expected over time. Overall, a non- irritant, aesthetically pleasing and satisfactory result was achieved (Figs. 27 – 29).



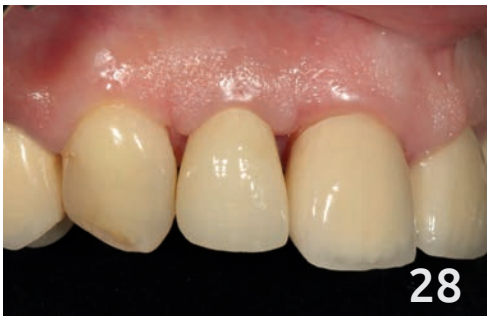


Fig. 27: Vertical view shows the individually shaped mucosa immediately before the installation of the definitive superstructure.

Fig. 28: Buccal view of the definitive crown in region #12.
Fig. 29: Radiographic control of the implant in region #12 after installation of the definitive crown.

Conclusion

Restoration in the anterior region is one of the greatest challenges in implant dentistry. The demands and expectations of patients regarding the aesthetic zone are very high. In order to meet these expectations and to achieve an aesthetically predictable and prognostically reliable aesthetic long-term result, it is vital to ensure the preservation of the soft tissue. Extensive augmentation of the bone and soft tissue should be avoided if possible, and the tissue should not be put under stress after implant placement.

Preventive, predictable and minimally invasive measures aid in preserving bone and soft tissue. In the present case, implant surgery in the aesthetic zone was successfully carried out by means of a gentle extraction technique, alveolar management adapted to the situation using ß-tricalcium phosphate collagen matrix (CERASORB® Foam) biologised according to LSCC, delayed implant placement, as well as direct soft tissue management after exposure using a prefabricated customised healing abutment. The case demonstrates how adequately sized and contoured hard and soft tissue for implant restoration in the aesthetically relevant zone can be achieved in preventive and efficient treatment steps that are kept as short as possible.

Take home messages:

- If no regenerative measures are taken after tooth extraction, an average bone loss of up to 60% after 12 months is likely to occur.
- Socket preservation in the aesthetic zone with **CERASORB® Foam** combined with I/A-PRF ensure a predictable and reliable long-term result in terms of bone and soft tissue regeneration.
- In its hydrated, biologised state, the collagen matrix **CERASORB® Foam** can be excellently shaped and adapted to the alveolar walls under maximal slight compression.
- Six weeks after extraction and socket preservation with **CERASORB® Foam**, implant insertion was performed. After a healing period of nearly three months, the definitive restoration of the implant was carried out.

Maximum Flexibility

CERASORB® Foam

CERASORB® Foam is a multiporous composite material consisting of collagen and resorbable bioceramics for bone augmentation. The use of phase pure β-tricalcium phosphate with regular interconnecting porosity and primary particle size results in degradation of the biomaterial simultaneously with bone formation.

The shapeable variant of the **CERASORB® Foam** with low density allows plastic deformation and can be individually adapted to the defect.

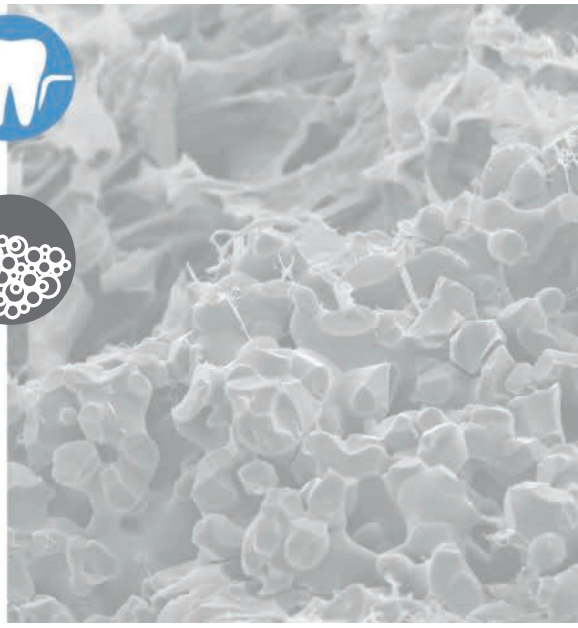
CERASORB® Foam is miscible with blood and I/A-PRF at a ratio of 1:1, producing an ideal kneadable mass for filling bone defects. The multiporosity of the granules embedded in the collagen helps bone to grow in faster. Blood components and body fluids can permeate the bone regeneration material unhindered and rapidly to accelerate osseous integration, vascularisation, and resorption.

Due to the specific composition of **CERASORB® Foam**, a high degree of volume stability is achieved even after degradation of the more rapidly resorbable collagen, while high X-ray density is maintained. In addition to the round granule form, which has only interconnecting micropores, **CERASORB® Foam** consists of polygonally broken β-tricalcium phosphate with micro-, meso- and macropores with a pore size up to 500 µm. The primary particles, which are above the phagocytizable size range, form a grid which is interspersed with an interconnecting system of micropores. Through this channel system, blood components and body fluid can enter the interior of the granules by capillary forces.

This serves both cell nutrition and hydrolytic dissolution of the material, also from the inside. In addition, it pro-motes pervasion of the material with blood vessels, cells and callus bones. The fibrillary collagen structure, which covers the bioceramic, also serves as an ideal scaffold for growth factors or antibiotics and provides significant support for soft-tissue regeneration.

Dental

Foam



Clinical use:

- Socket preservation after extraction
- Defect filling after atraumatic tooth extraction (Alveolar Ridge Preservation)
- External and internal sinus lift procedure
- Lateral and vertical augmentation in combination with a volume-providing membrane
- Periodontal defects
- Periimplantitis
- Defect filling after removal of a cyst

Product benefits:

- Fast conversion of the regenerative, synthetic augmentation material into natural bone tissue
- Easy handling due to defect-oriented modeling and comfortable positioning
- Ideal processing with blood and autologous platelet and fibrin concentrate (I/A-PRF)

CERASORB® bone regeneration materials
We offer tailor-made solutions for diverse requirements

You have our word!

Notes

Notes

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The specifications on the inserts enclosed with CERASORB® products are binding.

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