maxgraft®
maxgraft® bonering
maxgraft® bonebuilder
maxgraft® cortico

PROCESSSED HUMAN ALLOGRAFT
INTRODUCTION

Various bone graft materials are available to replace and regenerate bone matrix lost by tooth extraction, cystectomy or bone atrophy following loss of teeth or inflammatory processes.

Of all grafting options autologous bone is considered the “gold standard”, because of its biological activity due to vital cells and growth factors.

Yet, the autologous bone from intra-oral donor sites is of restricted quantities and availability, and the bone tissue obtained from the iliac crest is described to be subject to fast resorption. Moreover, the harvesting of autologous bone often requires a second surgical site associated with an additional bone defect and potential donor site morbidity. Thus, application of processed allogeneic bone tissue demonstrates a reliable and predictable alternative.

New bone formation after grafting with allogeneic bone tissue begins with an acute inflammatory response, within which granulomatous tissue gradually accumulates, and by activation of osteoclasts.

The incorporation process begins with the vascularization of the allograft. By activation of osteoclasts the immune system facilitates the remodeling of the graft. These large cells completely degrade medullary bone, thereby allowing its substitution by osteoblasts.

The immunological compatibility of processed allogeneic bone is not different from autologous tissue. In patients who received allogeneic bone grafts for ridge augmentation, no circulating antibodies could be detected in blood samples.

Moreover, several histological and morphological studies have well documented that there was no difference in the final stage of incorporation and new bone formation between allograft and autologous graft.

Classification

- Autologous:
  - Patient’s own bone, mostly harvested intra-orally or from the iliac crest
  - Intrinsic biological activity

- Allogenic:
  - Bone from human donors (multi-organ donors or femoral heads of living donors)
  - Natural bone composition and structure

- Xenogenic:
  - From other organisms, mainly bovine origin
  - Long-term volume stability

- Alloplastic:
  - Synthetically produced, preferably calcium phosphate ceramics
  - No risk of disease transmission

C-TBA is a non-profit organization aiming to maintain continuous medical supply of allografts under pharmaceutical conditions. Serving as a platform for the definition of safety standards and assurance of compliance with defined product qualities, C-TBA focuses on the specifications of human bone tissue as required in a large number of diseases that are associated with the loss of bone tissue.

The quality standards for donor selection, procurement, processing, quality control, storage and distribution of human tissue and cells are mandatory committed in the European Directives 2004/23/EC and 2006/17/EC. In addition, at the national level, the legal requirements are defined by the Austrian Tissue Safety Act (GSG, 2009).

To meet and comply with both European and national requirements, C-TBA has implemented a quality assurance system at pharmaceutical level, which is regularly audited by the competent national authority, the Austrian Federal Office for Safety in Health Care (BASG / AGES).

The C-TBA is certified as a tissue bank according to §19 and §22 of the Austrian Tissue Safety Act.

maxgraft® products are predominantly produced from living donor femoral heads after hip replacement surgery. Only cortico-cancellous blocks and cortical struts are produced from multi-organ donors.

The procurement, standardized by a predefined protocol, is carried out by certified procurement centers according to the European Directives. Tissue donations will only be carried out after the donor’s written consent. In addition, the health status of the potential donor is assessed in the context of a risk analysis and the donor is then selected on the basis of strict exclusion criteria. For all multi-organ donors the highest ethical and safety-related requirements are met.

After donor acceptance a series of serological testing is performed. In addition to antibody screening (Ab), nucleic acid tests (NAT) are performed. By using this method infections can be identified before antibodies are detected in the blood.

<table>
<thead>
<tr>
<th>Virus</th>
<th>Test</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B Virus (HBV)</td>
<td>HbsAg, HbcAb, NAT</td>
<td>negative</td>
</tr>
<tr>
<td>Hepatitis C Virus (HCV)</td>
<td>Ab, NAT</td>
<td>negative</td>
</tr>
<tr>
<td>Human Immunodeficiency Virus (HIV 1/2)</td>
<td>Ab, NAT</td>
<td>negative</td>
</tr>
<tr>
<td>Bacteria</td>
<td>CMIA</td>
<td>negative</td>
</tr>
<tr>
<td>Treponema pallidum (Lues)</td>
<td></td>
<td>negative</td>
</tr>
</tbody>
</table>

Blood samples are taken simultaneously to tissue-exploration during total hip replacement surgery or within 24h post mortem in case of multi-organ donation.

Safety and quality

Thorough donor anamnesis and serological testing combined with chemical and radiological sterilization offer maximal safety.

Reference samples

Samples are stored one year after the expiration date of the products, in order to be able to exclude maxgraft® as a source of transmission in case of a doubt. Despite worldwide monitoring, there is no single case of the transmission of a disease, caused by allografts used in dental medicine.

Virus inactivation

The critical viral inactivation steps of the Allotec® process – dynamic immersion in ethanol, hydrogen peroxide and gamma irradiation – have been validated for reliability and reproducibility by an independent test facility. Suspensions of model viruses for non-enveloped and enveloped DNA viruses (HBV), and non-enveloped (HAV) and enveloped RNA viruses (HIV, HCV, HTLV) have been applied. The process shows an overall efficacy in inactivating all test viruses globally > 6 logs (reference value for efficient viral inactivation > 4 logs) and therefore can be considered effective in removing potential viral contaminants.

Biomechanical properties have recently been analyzed by the Institute of Material Science of the Technical University of Vienna, Austria. After the determination of E-modulus and pressure resistance no significant alterations were detected in irradiated products (post rad.) compared to non-irradiated ones (post proc.).

The ALLOTEC® Process

Step 1: After crude removal of surrounding soft tissue, fat and cartilage, the donor tissue is brought into its final shape.

Step 2: The defatting of the donor tissue allows moderate penetration of solvents during subsequent processing.

Step 3: A treatment with alternating durations of diethyl ether and ethanol leaches out cellular components and denatures non-collagenic proteins, thereby inactivating potential viruses.

Step 4: An oxidative treatment further denatures persisting soluble proteins, thereby eliminating potential antigenicity.

Step 5: Freeze-drying by lyophilization preserves the natural structure of the tissue and maintains a residual moisture of < 5%, allowing quick rehydration and easy handling.

Finally, the tissue undergoes lyophilization, a desorption technique which facilitates the sublimation of frozen tissue water from solid phase to gas phase, thereby preserving the structural integrity of the material.

The tissue can be reconstituted rapidly due to microscopic pores within the material, which were created by the sublimating ice crystals. It has been well established that the lyophilization process preserves structural properties that improve graft incorporation.

The final sterilization by gamma irradiation guarantees a sterility assurance level (SAL) of 10⁻⁶ while ensuring structural and functional integrity of the product and its packaging.


In an extensive experimental setting virus inactivating capacity of the process was validated and considered effective.
maxgraft®
PROCESSED HUMAN ALLOGRAFT

maxgraft® is a sterile, high-safety allograft product, derived from human donor bone, processed by the Cells+Tissuebank Austria.

For experienced oral and maxillofacial surgeons, allograft bone blocks for block augmentation are the only real alternative to harvesting patients’ bone. A second surgical site to harvest autogenous bone and the associated risk of infection, donor-site morbidity, post-operative pain and loss of bone stability can be avoided. The excellent biological regeneration capability of maxgraft® results in a predictable clinical outcome.

Properties
- Preserved biomechanical properties
- Sterile without antigenic effects
- Storable at room temperature for five years
- Osteoconductive properties supporting natural and controlled tissue remodeling

Product Specifications
maxgraft® cancellous granules
Art.-No. Particle Size Content
30000 < 2.0 mm 1 × 0.5 ml
30010 < 2.0 mm 1 × 1.0 ml
30020 < 2.0 mm 1 × 2.0 ml
30040 < 2.0 mm 1 × 4.0 ml
30030 2.0-5.0 mm 1 x 3.0 ml

maxgraft® cortico-cancellous granules
Art.-No. Particle Size Content
31000 < 2.0 mm 1 × 0.5 ml
31010 < 2.0 mm 1 × 1.0 ml
31020 < 2.0 mm 1 × 2.0 ml
31040 < 2.0 mm 1 × 4.0 ml

maxgraft® blocks
Art.-No. Dimension Content
31111 uni-cortical, 10 × 10 × 10 mm 1 x block
31112 uni-cortical, 20 × 10 × 10 mm 1 x block
31113 uni-cortical, 30 × 10 × 10 mm 1 x block
31114 cancellous, 10 × 10 × 10 mm 1 x block
31115 cancellous, 20 × 10 × 10 mm 1 x block
31116 cancellous, 30 × 10 × 10 mm 1 x block

Surface
SEM pictures of maxgraft® illustrate the structure of the processed bone. Processing does not affect structural features and with its interconnecting macroporosity, maxgraft® is a natural human bone matrix. Because of the Allotec® process without sintering, maxgraft® retains its collagen matrix. At a higher magnification the structure of the mineralized collagen fibers can be recognized.

Indications:
Implantology, Periodontology and Oral and CMF Surgery

Granules
- Localized augmentation of the ridge for future implant placement
- Reconstruction of the ridge for prosthetic therapy
- Filling of osseous defects, such as extraction sockets
- Elevation of maxillary sinus floor
- Repair of intrabony periodontal defects

Blocks
- A predictable and highly effective alternative to traditional block grafting
- Ridge augmentation

Structure and tissue composition

Mineralized collagen
The thermograms analyses show the mass reduction following heating and helps to determine the content of water and organic components like collagen. Heating from room temperature up to 1000°C results in a staged mass reduction. The first reduction of ~ 35% can be attributed to the vaporization of water and the combustion of collagen, the second (~ 4%) to the vaporization of carbon dioxide.

SEM pictures of maxgraft® showing the staged mass reduction that indicates the chemical composition.
maxgraft® bonering
PROCESSED ALLOGENIC BONE RING

maxgraft® bonering is a pre-fabricated cancellous ring of human donor bone, which is placed press-fit into a trephine drill-prepared ring bed. At the same time, an implant is inserted into the ring. The bony integration of both, maxgraft® bonering and the implant, occurs via the surrounding vital bone.

Preparation of ring bed

After determination of the position of the implant by the planator tip and the pilot drill, the ring bed is prepared with the trephine. Subsequently, the planator allows even paving of the local bone for optimal contact with maxgraft® bonering and in addition, removes the cortical layer for improved graft revascularization.

Indications:
Implantology
- Vertical augmentation
- Horizontal augmentation
- Single tooth gap
- Edentulous space
- Sinus lift

Advantages
- Simultaneous implant placement and bone augmentation
- No second surgical procedure
- Significant reduction of treatment time

maxgraft® bonering surgical kit

With this surgical kit, botiss provides all necessary instruments to apply the maxgraft® bonering technique. The kit includes two convenient sizes of trephines, which precisely fit together with the maxgraft® bonering diameters.

The planators allow paving of the local bone to create a congruent and fresh contact surface of the implant area. The diamond disc and the diamond tulip help to shape the maxgraft® bonering for excellent adjustment to the local bone and for improved soft tissue healing. Altogether, these instruments allow optimal preconditions for the bony ingrowth of maxgraft® bonering.

Soft tissue management

After covering of the graft with a collagen membrane (Jason® membrane) a tension-free suturing of the operation area must be assured to avoid tissue perforation and graft exposure.

Product Specifications

maxgraft® bonering 3.3
(Height 10 mm, recommended implant diameters from 3.3 – 3.6 mm)

<table>
<thead>
<tr>
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<th>Dimension</th>
<th>Content</th>
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<tbody>
<tr>
<td>33160</td>
<td>cancellous ring, Ø 6 mm</td>
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</tr>
<tr>
<td>33170</td>
<td>cancellous ring, Ø 7 mm</td>
<td>1 x</td>
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maxgraft® bonering 4.1
(Height 10 mm, recommended implant diameters from 4.1 mm)

<table>
<thead>
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<td>cancellous ring, Ø 7 mm</td>
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<tr>
<td>33000</td>
<td>maxgraft® bonering surgical kit</td>
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<tr>
<td>33010</td>
<td>bonering fix</td>
<td>1 x</td>
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</table>
**maxgraft® bonebuilder**

**CUSTOMIZED ALLOGENIC BONE BLOCK**

maxgraft® bonebuilder is a customized allogenic bone block, which is individually adjusted to the bone defect. With maxgraft® bonebuilder, harvesting of autologous bone and manual adjustment of the obtained transplant is no longer required for the treatment of extensive defects. Donor site morbidity, operation time and costs can be significantly reduced.

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**In-house planning**

Botiss virtually designs the patient customized allogenic bone block based on the CT/CBCT-scan of the bone defect. The design of the bone block undergoes a final inspection by the clinical user and is, by individual order, released for production. The botiss partner Cells+Tissuebank Austria receives a *.stl* milling file and the patient matched allogenic bone block is produced under cleanroom conditions. The resulting bone block is ready for insertion into the defect with only minor adjustments.

After placement, the maxgraft® bonebuilder block is fixed with osteosynthesis screws. Residual defect volume should be filled with bone regeneration material and the augmentation site should be covered with a collagen membrane.

The strong capillary action of the three-dimensional, porous trabecular bone network enables fast and efficient penetration of nutrients and blood, resulting in excellent handling, as well as reliable and predictable outcomes.

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**Indications**

- Extensive bone defects
- Atrophic maxilla/mandible
- Horizontal/vertical augmentation

**Advantages**

- Individualized allogenic bone block
- Significantly reduced operation time
- Improved wound healing

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**The maxgraft® bonebuilder technology**

**1. Upload of CT/CBCT-data on**

www.botiss-bonebuilder.com

After registration, CT/CBCT-data of the patient can be uploaded on the botiss server. All radiological data have to single-frame data images. The only data type suitable for 3D planning is DICOM (*.dcm).

**2. Block design**

Botiss designers create a three-dimensional model of the radiological images and design a virtual bone block in consultation with the clinical user.

**3. Design quality check**

The clinical user receives a 3D PDF file containing the virtually constructed maxgraft® bonebuilder block and has to confirm its design.

**4. Individual order**

The production of the block starts after the clinical user fills in the patient based order form for the bone block to the attention of botiss biomaterials.

**5. Production of the individual bone block**

At C+TBA the *.stl data of the design is imported into a milling machine and a block of maximally 23 x 13 x 13 mm is produced.

**Product Specifications**

**maxgraft® bonebuilder**

<table>
<thead>
<tr>
<th>Art.-No.</th>
<th>Content</th>
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<tr>
<td>PMla</td>
<td>Individual planning and production of a bone block max. dimensions 23 x 13 x 13 mm</td>
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<tr>
<td>PMla 2</td>
<td>additional block(s) for the patient</td>
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</table>

**bonebuilder dummy**

<table>
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<th>Content</th>
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<tbody>
<tr>
<td>BP100</td>
<td>Individual 3D printed model of the patient’s defect including the planned maxgraft® bonebuilder block(s) for demonstration purposes, material: synthetic filament</td>
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The customized maxgraft bonebuilder block allows precise horizontal and vertical reconstruction of the atrophic ridge.

The CT/CBCT-data of the bone defect is transferred into a 3D model.
**maxgraft® cortico**

**SHELL TECHNIQUE**

**WITH ALLOGENIC BONE PLATES**

maxgraft® cortico is a prefabricated plate made of processed allogenic bone. Similarly to the autogenous bone, it can be used for the shell technique.

maxgraft® cortico was developed to avoid the donor-site morbidity and to prevent the time-consuming harvesting and splitting of autologous cortico-cancellous bone blocks.

**Preparation of the augmentation area**

The proper size of the plate is estimated after the elevation of the mucosal flap or preoperatively using a digital planning software. Using a diamond disc, the plate is then cut extraorally.

**Fixation and adaption**

The plate is positioned with a distance by predrilling through plate and local bone and fixation with osteosynthesis screws to create a fixed compartment. It is pivotal to drill threaded holes into the cortical plates, which prevent the plates from gliding on screw threats. Therefore, a drilling head with 0.2 mm smaller diameter than that of the applied screws is recommended for drilling (e.g. use a 1 mm drilling head for 1.2 mm screws). To prevent perforations of the soft tissue, sharp edges need to be removed, e.g. by using a diamond ball.

**Indications:**
- Vertical augmentation
- Horizontal augmentation
- Complex three-dimensional augmentations
- Single tooth gaps
- Fenestration defects

**Filling and wound closure**

The space between local bone and cortical plate can be filled with a variety of different particulated bone grafting materials. Then, the augmentation area needs to be covered with a barrier membrane (Jason® membrane, colprotect® membrane) and a tension-free and saliva-proof closure must be applied.

**Advantages**
- Established augmentation technique with new material
- Significant reduction of operation time
- No donor-site morbidity
- No limitation of augmentation material

**Properties**
- Osteoconductive
- Natural and controlled remodeling
- Conserved biomechanical parameters

**Natural bone regeneration**

To facilitate osteogenesis, allogenic particles can be used to fill the defect. The preserved human collagen provides an excellent osteoconductivity and enables a complete remodeling. Mixing with autologous chips or particulated PRF matrices can support the ossification.

**Six months after transplantation:**

Six months after transplantation, a superficial resorption of the plate can be seen; the stability, however, is maintained.

**Product Specifications**

<table>
<thead>
<tr>
<th>maxgraft® cortico</th>
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<tbody>
<tr>
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<table>
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<th>Cortico trimmer</th>
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<tbody>
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</table>

**More details on the surgical procedure on:**

**BOTISS-DENTAL.COM**
Mobilization and pre-fixation of the surrounding soft tissue

Clinical situation in the maxilla before extraction

Augmentation of the maxillary ridge and filling of extraction sockets with maxgraft® granules. Placement of mucoderm® to improve soft tissue situation and Jason® membrane to cover surgical site

Mobilization and pre-fixation of the surrounding soft tissue

Clinical situation in the maxilla before extraction

Maxillary ridge in situ after preparation of mucosal flap

Maxillary ridge in situ after preparation of mucosal flap

Atrophic maxillary ridge after preparation of mucosal flap

Fixation of the prepared maxgraft® blocks

Manual adjustment of maxgraft® blocks on a CAD/CAM-based model

Clinical situation

Filling of residual gaps with cerabone® and covering with Jason® membrane

Tension-free closure of mucosal flap

Insertion of three implants

Six months after re-entry: patient is ready for final prosthesis

X-ray five months post-operative

Clinical situation five months post-operative

Insertion of three implants and gingiva formers

GBR/GTR

Resorbable collagen membranes act as a temporary barrier against ingrowth of fast proliferating fibroblasts and epithelium into the defect, and maintain the space for controlled regeneration of bone. The Jason® membrane is a pericardium membrane providing a long-lasting barrier function for ~three to six months. Mucoderm®, a three-dimensional collagen matrix, supports revascularization and fast soft tissue integration and thus, is a valid alternative to patients’ own connective tissue. When applying mucoderm® simultaneously with a bone graft material please assure adequate mobilization of the surrounding soft tissue.

Antibiotics

When performing hard tissue augmentation, the patient should be treated with a sufficient dose of antibiotics to minimize the risk of infection and related possible graft loss. A potential treatment plan could include starting the antibiotics one day prior or at least one hour before surgery by ingestion of a full daily dose. In case of extensive jaw reconstruction a bacteriological screening (saliva sample) should be considered.

CLINICAL CASE BY
Dr. Fernando Rojas-Vizcaya, Castellón, Spain

SOCKET PRESERVATION WITH MAXGRAFT® GRANULES

CLINICAL CASE BY
Dr. Damir Jelušić, Opatija, Croatia

RIDGE AUGMENTATION WITH MAXGRAFT® CANCELLOUS BLOCKS
PART I: VERTICAL AUGMENTATION WITH MAXGRAFT® BONERING

Preparation of the ring bed in an atrophic mandible (third quadrant)

Vertical augmentation by placing a maxgraft® bonering

Simultaneous horizontal augmentation

Stable implant insertion

Insertion of second maxgraft® bonering and implant

Filling of the residual defect volume with cerabone® and covering the operation site with a Jason® membrane

Vertical augmentation with maxgraft® bonering

For the reconstruction in an atrophic jaw a vertical augmentation of up to 3 mm above local bone level can easily be achieved. If more vertical height is desired, enhancing additives such as bone morphogenic proteins (BMP) or growth factors are in discussion to be beneficial. For vertical and horizontal augmentation of a severely atrophic mandibular, the width of the ridge (in case of parallel-walled ridge) has to be at least 4 mm for successful application of maxgraft® bonering.

The maxgraft® bonering allows for direct implant insertion during sinus lift by providing the necessary primary stability. The sinus cavity should be filled with an additional grafting material (e.g. cerabone®, maxresorb® or maxresorb® inject).

Tension-free soft tissue management

X-ray nine months post-operative: full integration of maxgraft® bonering and implants and proceeding remodeling of the grafts

PART II: SINUS LIFT WITH MAXGRAFT® BONERING

Preparation of a lateral window for sinus floor elevation in the first quadrant

Mobilization of the Schneiderian membrane

Insertion of the first implant

Placement of maxgraft® bonering

Implant insertion in maxgraft® bonering from the crestal side

Filling of the residual sinus cavity with cerabone®

Placement of Jason® membrane

Clinical situation in the second quadrant: vertical and horizontal defect in the maxillary ridge; sinus cavity is filled with cerabone®

Preparation of the defect with a trephine

Press-fit placement of maxgraft® bonering into the defect

Direct implantation in the cancellous ring

Tension-free suturing after placement of Jason® membrane

X-ray nine months post-operative: full integration of maxgraft® bonering and implants and proceeding remodeling of the grafts
Pilot drill in the recipient site

Preparation of the ring bed with the trephine

Paving of the local bone using the planator from maxgraft® bonering surgical kit

Measurement of the defect

Placement of the ring into the ring bed

Due to its structure the ring is instantly soaked with blood

Implant insertion in maxgraft® bonering; the shape of the ring mimics the anatomic structure of the ridge

Gaps are filled with cerabone® and the augmentation site is covered with a Jason® membrane

Tension-free wound closure

Wound dehiscence and graft exposure can be complications of block augmentation. After removal of necrotic soft tissue and infected hard tissue (use rotating instruments if necessary) the augmented area should be rinsed with chlorhexidine. Subsequently, the graft has to be covered again, if necessary, by harvesting a palatal soft tissue transplant.

Perfect fit of maxgraft® bonebuilder

Fixation of the blocks with screws for osteosynthesis

Contouring with cerabone®

Covering of the block with Jason® membrane

Horizontal mattress suture and tension-free wound closure

Design quality check

The design of maxgraft® bonebuilder has to be checked very carefully before it is released for production. Only the surgeon himself can assess the patients’ soft tissue situation and therefore, the required dimensions of the block. The botiss construction team will adjust the design of the block until it perfectly meets the expectations of the clinician.
Fixation of the block with screws for osteosynthesis

Virtual planning of the block

CT scan of region 36, 37 before surgery

Clinical situation before augmentation

maxgraft® bonebuilder

Immediate implant insertion in regio 34, 35; positioning and fixation of maxgraft® bonebuilder

Filling of residual volume with cerabone®

Situation after tooth extraction and mobilization of mucosal flap

Covering of the augmentation site with collprotect® membrane

Wound closure and suturing

CT scan of region 36, 37 after surgery

RIDGE AUGMENTATION WITH MAXGRAFT® BONEBUILDER

CLINICAL APPLICATION OF MAXGRAFT® BONEBUILDER

CLINICAL CASE BY
Dr. Michele Jacotti, Brescia, Italy

RIDGE AUGMENTATION WITH MAXGRAFT® BONEBUILDER

CLINICAL CASE BY
Dr. Viktor Kalenchuk, Chernivtsi, Ukraine

Virtual planning of the block

Patient matched maxgraft® bonebuilder

Situation after mucosal flap preparation and perforation of the cortical layer

Exact positioning of the maxgraft® bonebuilder block

3D implant positioning

Stable implant insertion

Abutment placement after ingrowth of the implants

Final prosthesis

Fixation of the block with screws for osteosynthesis

Careful wound closure

Clinical situation at re-entry five months post-operative

Full bony ingrowth of the block

maxgraft® bonebuilder

Immediate implant insertion in regio 34, 35; positioning and fixation of maxgraft® bonebuilder

Filling of residual volume with cerabone®

Covering of the augmentation site with collprotect® membrane

Wound closure and suturing

CT scan of region 36, 37 after surgery

Virtual planning of the block

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Filling of residual volume with cerabone®

Covering of the augmentation site with collprotect® membrane

Wound closure and suturing

CT scan of region 36, 37 after surgery

maxgraft® bonebuilder are fixed with screws for osteosynthesis, preferably with flat-headed screws to avoid perforation of the surrounding soft tissue.
Rehydration
The processing of the C-TBA products preserves the natural collagen and maintains a residual moisture of <5%. According to our clinical users rehydration is not necessary and the products are ready for immediate use.

FRONTAL DEFECT TREATED WITH MAXGRAFT® CORTICO

Severe atrophy in the aesthetic region
Preparation of the defect
maxgraft® cortico in preparation

Fixation with osteosynthesis screws
Augmentation with cerabone®
Covering with Jason® membrane and saliva-proof wound closure

SINGLE TOOTH RESTAURATION WITH MAXGRAFT® CORTICO

Single tooth defect with severely resorbed vestibular wall
Fixation of maxgraft® cortico using an osteosynthesis screw
Augmentation with maxgraft®, granules mixed with particulated PRF matrix and fixation of a second maxgraft® cortico
Covering of the augmentation area with Jason® membrane

Defect fill and contouring using autologous and allogenic (maxgraft®) particles. Covering of the augmentation site with Jason® membrane

STABLE IMPLANTATION

Preoperative CBCT-scan; vestibular view
Situation after defect uncovering: careful detachment of the lingual mucosa from the suprahyoid muscles for flap mobilization
Combined horizontal and vertical 3D-bone augmentation with the shell technique. Adaptation of the cortical plates and fixation with 1 mm microscrews
Additional application of L-PRF matrices for improved wound healing
Saliva-tight and tension-free wound closure by a combination of horizontal mattress and single button sutures

Implantation of two Straumann Bone Level Tapered Implants in accordance to the attachment level of the neighboring teeth
Situation after re-entry via stab incision with soft tissue displacement; Straumann Conical Shape 6.5 Height 4 mm
Final dental crowns with provisional capping of the screw channels
### maxgraft® cancellous granules

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<th>Art.-No.</th>
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### maxgraft® cortico-cancellous granules

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### maxgraft® blocks

<table>
<thead>
<tr>
<th>Art.-No.</th>
<th>Dimension</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>31111</td>
<td>uni-cortical, 10 x 10 x 10 mm</td>
<td>1 x block*</td>
</tr>
<tr>
<td>31112</td>
<td>uni-cortical, 20 x 10 x 10 mm</td>
<td>1 x block*</td>
</tr>
<tr>
<td>32111</td>
<td>cancellous, 10 x 10 x 10 mm</td>
<td>1 x block</td>
</tr>
<tr>
<td>32112</td>
<td>cancellous, 20 x 10 x 10 mm</td>
<td>1 x block</td>
</tr>
</tbody>
</table>

### maxgraft® bonering surgical kit

#### maxgraft® bonering

- **maxgraft® bonering 3.3**
  - Height: 10 mm
  - Recommended for implant diameters from 3.3 - 3.8 mm
<table>
<thead>
<tr>
<th>Art.-No.</th>
<th>Dimension</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>33160</td>
<td>cancellous ring ø 6 mm</td>
<td>1 x</td>
</tr>
<tr>
<td>33170</td>
<td>cancellous ring ø 7 mm</td>
<td>1 x</td>
</tr>
</tbody>
</table>

- **maxgraft® bonering 4.1**
  - Height: 10 mm
  - Recommended for implant diameters from 4.1 mm
<table>
<thead>
<tr>
<th>Art.-No.</th>
<th>Dimension</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>33174</td>
<td>cancellous ring ø 7 mm</td>
<td>1 x</td>
</tr>
</tbody>
</table>

### maxgraft® bonebuilder

<table>
<thead>
<tr>
<th>Art.-No.</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>33000</td>
<td>1 x trephine 7 mm</td>
</tr>
<tr>
<td>33001</td>
<td>1 x trephine 6 mm</td>
</tr>
<tr>
<td>33010</td>
<td>1 x planator 7 mm</td>
</tr>
<tr>
<td>33020</td>
<td>1 x planator 6 mm</td>
</tr>
<tr>
<td>33110</td>
<td>1 x diamond disc 10 mm</td>
</tr>
<tr>
<td>33130</td>
<td>1 x diamond tulip 3 mm</td>
</tr>
</tbody>
</table>

### maxgraft® bonebuilder dummy

- **maxgraft® bonebuilder dummy**
<table>
<thead>
<tr>
<th>Art.-No.</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>33100</td>
<td>Individual 3D printed model of the patient’s defect and the planned bonebuilder for demonstration purposes made of synthetic filament</td>
</tr>
</tbody>
</table>

### maxgraft® cortico

<table>
<thead>
<tr>
<th>Art.-No.</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>31251</td>
<td>cortical strut, 25 x 10 x 1 mm*</td>
</tr>
<tr>
<td>31253</td>
<td>cortical strut, 25 x 10 x 1 mm*</td>
</tr>
</tbody>
</table>

### maxgraft® cortico-trimmer

- **maxgraft® cortico-trimmer**
<table>
<thead>
<tr>
<th>Art.-No.</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>34000</td>
<td>cortico-trimmer</td>
</tr>
</tbody>
</table>
Innovation.
Regeneration.
Aesthetics.