bone & tissue regeneration

botiss biomaterials

collprotect® membrane

NATURAL COLLAGEN MEMBRANE

FOR GBR/GTR TECHNIQUE

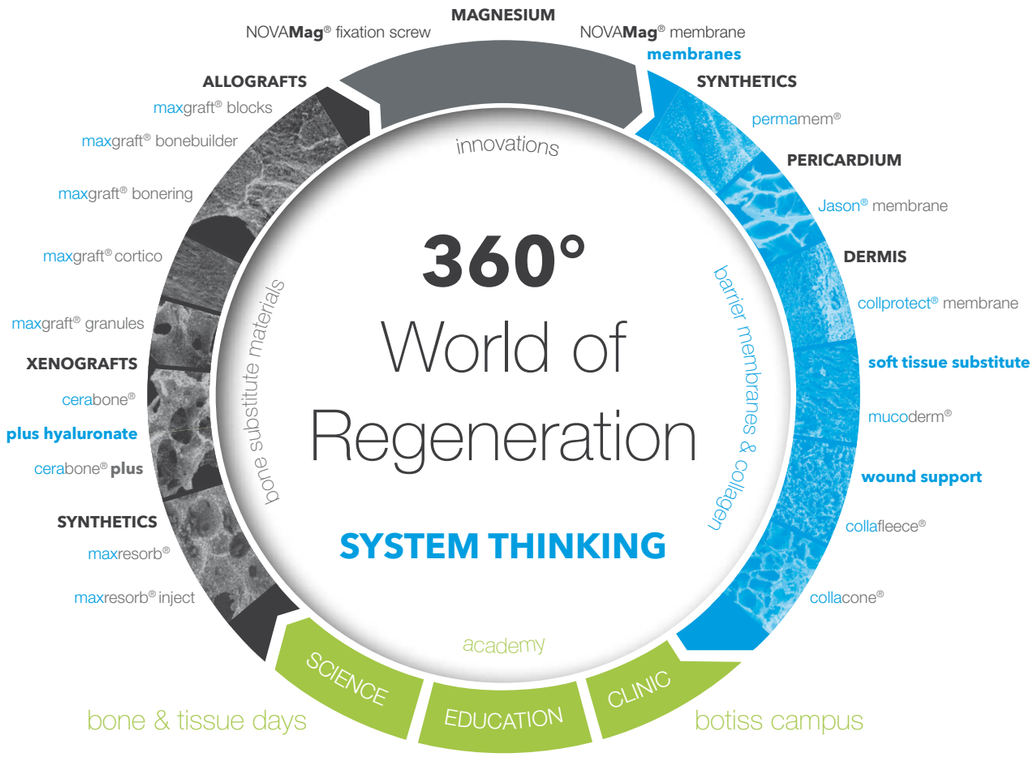
native

reliable

resorbable

dermis

botiss regeneration system



Development / Production / Distribution

maxresorb®

Synthetic biphasic calcium phosphate

maxresorb® inject

Synthetic injectable bone paste

cerabone®

100% pure bovine bone mineral

cerabone® **plus**

cerabone® mixed with hyaluronate

maxgraft®

Processed allogenic bone graft

maxgraft® cortico

Processed allogenic bone plate

maxgraft® bonering

Processed allogenic bone ring

maxgraft® bonebuilder

Patient matched allogenic bone implant

NOVA**Mag**® fixation screw

Resorbable magnesium screw

NOVA**Mag**® membrane

Resorbable magnesium membrane

permamem®

High-density PTFE barrier membrane

Jason® membrane

Native pericardium GBR / GTR membrane

collprotect® membrane

Native collagen membrane

mucoderm®

3D-stable soft tissue graft (Collagen)

collacone®

Collagen hemostat (Cone)

collafleece®

Collagen hemostat (Sponge)

bone & tissue regeneration

botiss biomaterials

360° – the botiss regeneration system: Innovation, Safety, Reliability, and Aesthetics

botiss biomaterials offers a unique systematic BTR approach – the complete regenerative biomaterial portfolio for Implantology, Oral and CMF Surgery, and Periodontology at hand.

We all know – no single bone graft or soft tissue biomaterial can suit all medical needs, biological situations, and indications. Factors, such as indication, age, hygiene, biotype, bone height, and treatment plan, require a sophisticated approach with different, coordinated products.

To achieve optimal results, we offer you the botiss regeneration system. It includes all long-term proven biological materials (e.g., bovine, synthetic, allografts, collagen, granules, blocks, membranes, and soft tissue matrices), which can be used in various combinations for each specific indication. All products are manufactured according to the highest quality standards.
Patient's safety, ease of use and reliable treatment results – these are your and our first priorities. The products of the botiss regeneration system have proven their success in terms of safety, efficacy, and reliability in a multitude of preclinical and clinical studies and, most importantly, in the daily clinical work, with hundreds of thousands of patients treated worldwide.

We substantially invest in research and education. Unique innovations, such as cerabone® plus and NOVAMag®, the concept of highquality learning and education with the botiss academy, and our international bone & tissue days are the results of our partnership with worldwide renowned academic research institutes, global opinion leaders, and practitioners in their daily clinical environment.

botiss biomaterials is one of the leading companies in the field of dental bone and tissue regeneration. The botiss regeneration system is available in over 100 countries worldwide via a global network of distribution partners and employees, who are committed experts in the field of oral surgery and implantology.

botiss biomaterials is an innovative, clinically oriented medical device/pharmaceutical company headquartered in Germany and further development and production sites in Germany, Austria and England.

We proudly welcome you to the botiss regeneration system community. We invite you to share your experiences and suggestions with us, which are precious to further improve our products or develop new product concepts.

Dr. Drazen Tadic
dt@botiss.com

Oliver Bielenstein
ob@botiss.com

collprotect® membrane

NATIVE **COLLAGEN MEMBRANE**

collprotect® membrane is a native collagen membrane made of porcine dermis. Its multistep cleaning process ensures the removal of all antigenic and non-collagenous components, at the same time preserving its natural collagen structure.

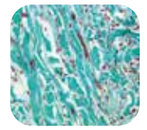
SEM image of collprotect® membrane

The unique processing as well as the dense but open-porous collagen structure of collprotect® membrane are the basis for its safe application in dental bone and tissue regeneration.

INDICATIONS:

Implantology, Periodontology and Oral and CMF Surgery

- Horizontal augmentation
- Socket and ridge preservation
- Sinus lift
- Protection and covering of minor perforations of the Schneiderian membrane
- Fenestration and dehiscence defects
- Intraosseous defects (1 to 3 walls)
- Furcation defects (class I and II)



Histology six weeks after implantation of collprotect® membrane in a rat model: Blood vessels have penetrated the porous structure. Collagen fibers are visible and the degradation proceeds without any inflammatory response

Owing to its natural hemostyptic function, the membrane enables early wound stabilization, thus supporting the natural wound healing[1]. The rough surface of collprotect® membrane facilitates a fast integration into the surrounding soft tissue[2].

PROPERTIES

- Natural compact, open-porous collagen structure[3]
- No artifical cross-linking
- Natural rough surface for cell adhesion and migration[2]
- Pores for blood vessel ingrowth, support of vascularization[3]
- Controlled degradation[4]
- Natural collagen to support blood clot formation / natural healing[1]
- Easy handling in dry and wet status[5]

PRODUCT SPECIFICATIONS

Art.No.	Size	Content
601520	15 x 20 mm	1 membrane
602030	20 x 30 mm	1 membrane
603040	30 x 40 mm	1 membrane

THE ORIGIN
OF COLLAGEN MEMBRANES

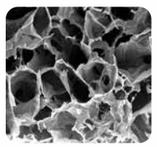
The first collagen membranes available on the market were of bovine origin (Achilles tendon and pericardium). Nowadays, porcine membranes are widely used because their application excludes the risk of BSE transmission.

Moreover, porcine collagen exhibits a high homology to human collagen and therefore a very low antigenicity[6]. Due to these reasons, botiss collagen membranes are exclusively produced from porcine collagen.

Collagen membranes may be derived from various tissues, ranging from dermis, to peritoneum and pericardium. Accordingly, these membranes differ in their handling and degradation properties, as well as their barrier function.

PROPERTIES OF **NATIVE DERMAL MEMBRANES**

The stability and barrier function of collagen membranes are tightly linked to the properties of the native tissue from which they originate.



3D structure of a collagen fleece

Collagens are resistant to any unspecific proteolytic degradation and are only degraded by specific enzymes called collagenases. Collagens are involved in the primary hemostatic reaction. Thus, collagen membranes contribute to a fast stabilization of the wound area. Another advantage of collagen is its chemotactic attraction of regenerative cells such as osteoblasts, gingival fibroblasts and periodontal ligament cells.

Following dehiscence, the exposure of a collagen membrane leads to its quick proteolytic degradation. However, a secondary granulation without any inflammatory reaction may be observed[6].

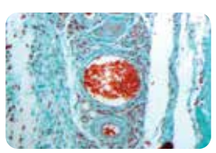
BENEFITS

- Exceptional biocompatibility
- Support of hemostasis
- Low antigenicity
- Degradation by specific enzymes
- Chemotactic attraction of regenerative cells

THE ADVANTAGES OF COLLAGEN

Several factors make collagen an optimal biological material for the use as barrier membranes. One important characteristic is the excellent biocompatibility of collagen and its degradation products. Collagen is widely distributed throughout the body, making up approx. 60% of all proteins within the gingival connective tissue. Due to their low antigenicity, animal collagens may be used in humans without causing tissue rejection.

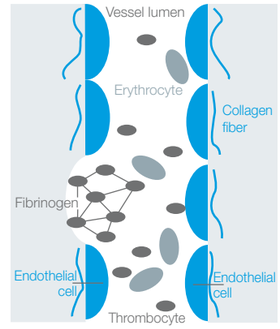
Denser collagen structures offer longer barrier functions. However, extremely dense collagen structures may hinder early angiogenesis of the grafting site. The ingrowth of blood vessels into the augmentation area is important not only for the nutrition of the grafting site, but also for attraction of circulating progenitor cells (pericytes). These cells have the potency to differentiate into osteoblasts, which produce new bone matrix. Therefore, the selective permeability of membranes for blood vessels is desirable[5]. collprotect® membrane possesses loosely structured areas (pores) that originate from the hair follicles of the porcine skin. These pores penetrate the compact collagen matrix and support a fast vascularization of the membrane[3].



Histology after subcutaneous impantation in rats demonstrating the presence of blood vessels within collprotect® membrane

COLLAGEN – **A NATURAL HEMOSTATIC AGENT**

Damage to the blood vessel wall leads to subendothelial collagen exposure. The collagen directly or indirectly interacts with the surface receptors on thrombocytes. The binding of collagen initiates a reaction cascade leading to transformation and aggregation of the thrombocytes. Additionally, the thrombocytes are cross-linked by fibrinogen. The resulting (white) thrombus initially stabilizes the wound[6]. Accordingly, collagen membranes support the formation of a blood coagulum and contribute to a rapid stabilization of the wound area. Due to their hemostatic effect, collagens are not only used as barrier membranes, but also as collagen sponges and cones for stabilization of biopsy harvesting sites or covering of minor oral wounds and extraction sockets.



In vivo pre-clinical testing

collprotect® membrane

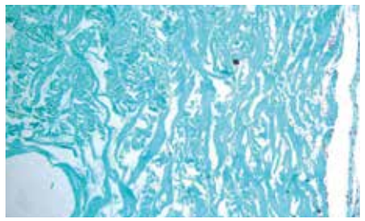
RAPID ANGIOGENESIS AND TRANSMEMBRANOUS VASCULARIZATION

In vivo results from a rat model, Prof. Dr. Dr. D. Rothamel, Mönchengladbach Hospital, University of Düsseldorf[3]

One week after subcutaneous implantation of collprotect® membrane in rats, cells started to superficially invade the membrane. No signs of inflammatory reactions were observed. collprotect® membrane exhibits good integration into the well-vascularized peri-implant tissue.

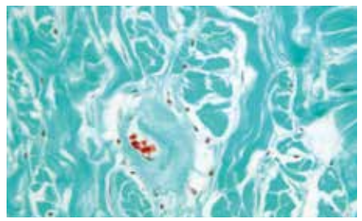
After four weeks, blood vessels within the pores of the membrane indicate transmembranous vascularization. Early vascularization of the membrane supports the nutrition and integration of the grafted site, thereby promoting osseous regeneration. Furthermore, the regeneration is promoted by circulating progenitor cells that reside in the blood vessels and evolve into bone forming osteoblasts.

Seven days after implantation

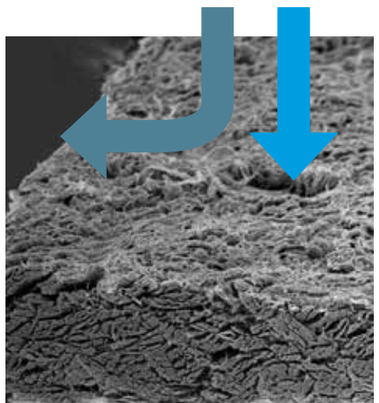


Seven days after implantation, only superficial invasion of cells into the membrane can be observed, an empty pore in the membrane in the lower left part is recognizable.

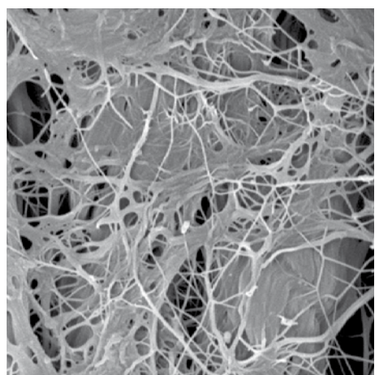
28 days after implantation



28 days after implantation, ingrowth of blood vessels into the pores of the membrane can be observed.



Areas of a fibrillary structure within the dense collagen fiber network of the collprotect® membrane (pores, see right picture and arrow in left picture) facilitate the ingrowth of blood vessels into the defect area through the membrane.



Production process

collprotect® membrane

PROVIDES EXCELLENT HANDLING AND STABILITY

All botiss soft tissue products consist of natural porcine collagen originating from animals destined for the food industry and certified according to EN ISO 22442.

DERMIS

Multi-stage cleaning process

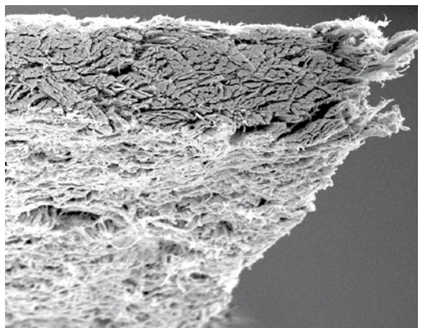
collprotect® membrane is a native collagen membrane, the natural properties of the original tissue (dermis or pericardium) are preserved during the production process[3]. The inherent architecture of the collagen structure provides superior handling properties, such as tear resistance, tensile strength, and adaptation to surface contours, in comparison to „non-native“ collagen membranes (e.g. made from a collagen suspension)[8].

Lyophilization

Packaging y-sterilization

Sterile product

The particular multi-stage cleaning process effectively removes all non-collagenic proteins and antigenic components. The resulting membranes exhibit a natural three-dimensional collagen structure mainly composed of collagen type I and a lower share of collagen type III.



collprotect® membrane

CLINICAL APPLICATION

CLINICAL CASE BY
PD Dr. Raluca Cosgarea and Prof. Dr. Dr. Anton Sculean,
University Cluj-Napoca, Romania and University Bern, Switzerland

REGENERATION OF INTRABONY DEFECTS WITH CERABONE® AND COLLPROTECT® MEMBRANE

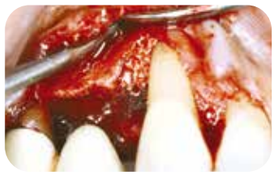
Preoperative defect measurement

Preoperative X-ray showing intrabony defect

Defect presentation after preparation of mucoperiosteal flap

Rehydration of cerabone® particles

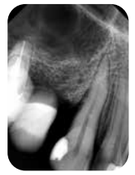
collprotect® membrane cut to shape



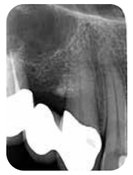
Filling of intrabony defect with cerabone®

collprotect® membrane in place

Wound closure



X-ray control at 12 months post-operative

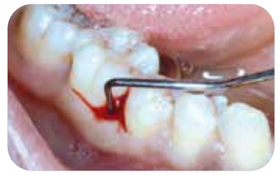


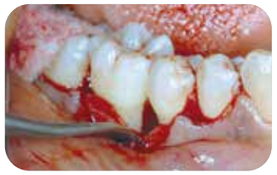
X-ray at 24 months post-operative

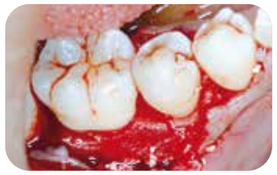
Final prosthetic restoration

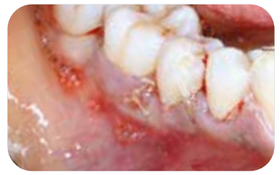
CLINICAL CASE BY
Dr. Dominiki Chatzopoulou, University College London (UCL), England

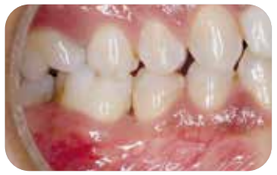
GTR WITH CERABONE® AND COLLPROTECT® MEMBRANE USING THE SIMPLIFIED PAPILLA PRESERVATION TECHNIQUE

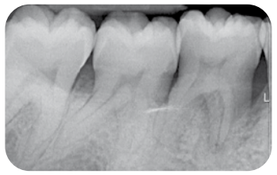

PPD of 9 mm at mesial of LR6

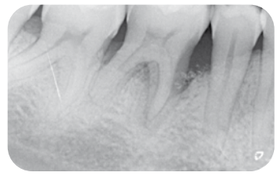

Raised flap showing the defect

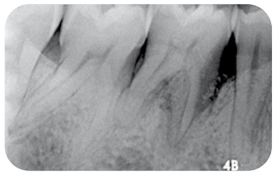

Defect filled with cerabone® and covered with collprotect® membrane


Flap sutured


Healing six weeks post-operative

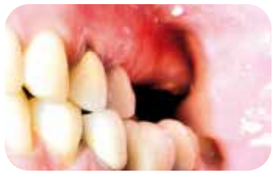

Preoperative radiograph

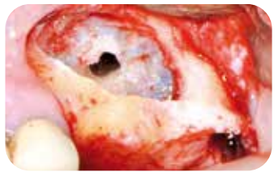

Six months post-operative radiograph

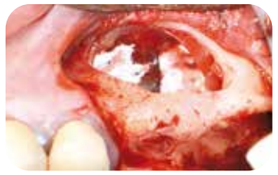

12 months post-operative radiograph

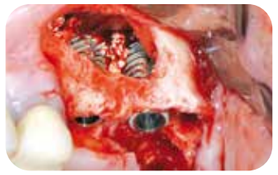
CLINICAL CASE BY
Dr. Viktor Kalenchuk, Chernivtsi, Ukraine

SINUS LIFT WITH IMMEDIATE IMPLANTATION


Clinical situation of the edentulous distal maxilla

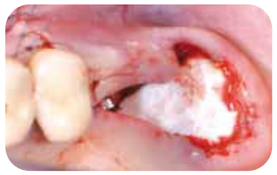

Visible perforation of the Schneiderian membrane after preparation of a lateral sinus window


Introduction of collprotect® membrane to protect the Schneiderian membrane

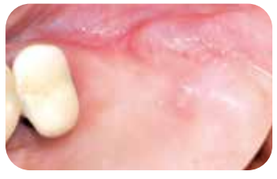

Implantation and simultaneous augmentation with cerabone®


Filling of the subantral cavity with cerabone® 1.0 - 2.0 mm

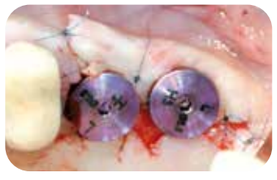

Covering of the augmentation site with collprotect® membrane

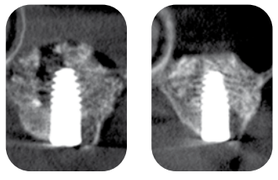

Soft tissue defect coverage with collagen fleece


Wound closure and suturing


Satisfactory soft tissue situation after six months healing time


Bone regeneration after six months healing time


Placement of healing screws

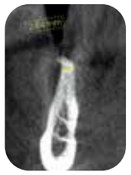

Alveolar ridge and sinus floor CT scan immediately after the surgery (l) and after six months (r)

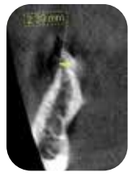
In cases involving an unstable soft tissue situation, or if wound dehiscence is expected, a collagen fleece is recommended to cover the barrier membrane in order to provide extra protection for the healing area. Where applicable, the fleece can be loaded with antibiotics.

CLINICAL CASE BY
Dr. Viktor Kalenchuk, Chernivtsi, Ukraine

RIDGE AUGMENTATION WITH MAXGRAFT® BONEBUILDER

Clinical situation before augmentation

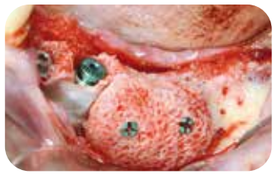




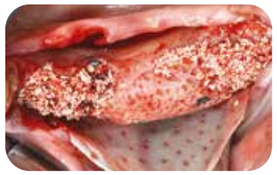
CT scan of regio 36, 37 before surgery

Situation after tooth extraction and mobilization of a mucoperiosteal flap

maxgraft® bonebuilder



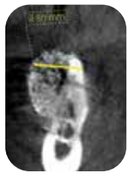
Immediate implant insertion in regio 34, 35; positioning and fixation of maxgraft® bonebuilder

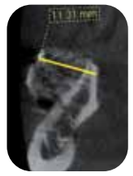


Placement of collprotect® membrane and filling of the residual volume with cerabone®

Covering of the augmentation site with collprotect® membrane

Wound closure and suturing

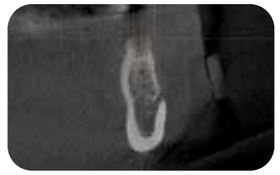




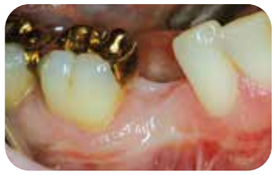
CT scan of regio 36, 37 after surgery

CLINICAL CASE BY
Dr. Georg Bayer, Landsberg am Lech, Germany

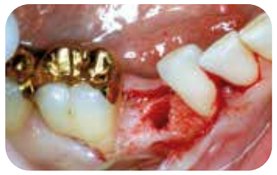
LATERAL AUGMENTATION



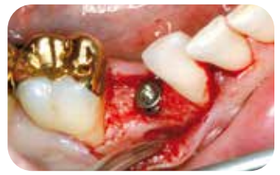
CBCT image showing the reduced amount of bone available in the area of the mental foramen



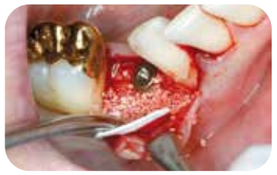
Lateral bone defect following root tip resection



After preparation of the implant bed the thin vestibular wall is visible

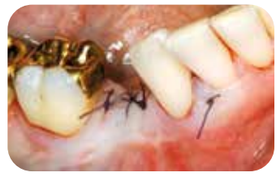


Insertion of implant in the reduced bone amount

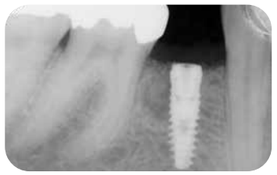


Lateral augmentation with maxresorb® and application of a dry collprotect® membrane

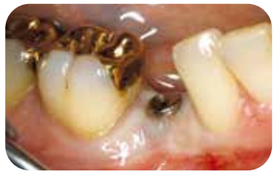
Complete covering of the augmentation site and implant with the membrane



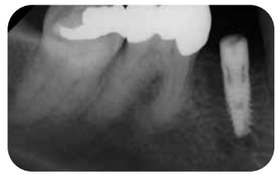
Wound closure by soft tissue expansion without vertical releasing incisions



Post-operative X-ray



Stable keratinized gingiva after insertion of healing abutment at re-entry



X-ray control at re-entry

bone & tissue regeneration

botiss biomaterials

Innovation.
Regeneration.
Aesthetics.

soft tissue

education

hard tissue

botiss biomaterials GmbH
Hauptstr. 28
15806 Zossen
Germany

Tel.: +49 33769 / 88 41 985
Fax: +49 33769 / 88 41 986

www.botiss.com
facebook: botissdental
instagram: botiss_dental

LITERATURE

1. Bunyaratavej and Wang (2001). Collagen membranes: a review. J Periodontol. 72(2):215-29.
2. Stähli et al. (2016). Collagen Membranes Adsorb the Transforming Growth Factor-β Receptor I Kinase-dependent Activity of Enamel Matrix Derivative. J Periodontol. 87(5):583-90.
3. Rothamel et al. (2012). Clinical aspects of novel types of collagen membranes and matrices: Current issues in soft-and hard-tissue augmentation. EDI Journal 1:62.
4. Barbeck et al. (2015). Porcine Dermis-Derived Collagen Membranes Induce Implantation Bed Vascularization Via Multinucleated Giant Cells: A Physiological Reaction? J Oral Implantol. 41(6):e238-51.7(5):583-90.
5. Usability testing collprotect® membrane, data on file
6. Schwarz et al. (2006). Einsatz nativer und quervernetzter Kollagenmembranen für die gesteuerte Gewebe- und Knochenregeneration. SCHWEIZ MONATSSCHR ZAHNMED 116(11): 1112.
7. Nuyttens et al. (2011). Platelet adhesion to collagen. Thromb Res 127 Suppl 2:S26-9.
8. Ortolani et al. (2015). Mechanical qualification of collagen membranes used in dentistry. Ann Ist Sanita. 51(3):229-235.

Rev.: BCMen-01/2024-04