

bone & tissue
regeneration

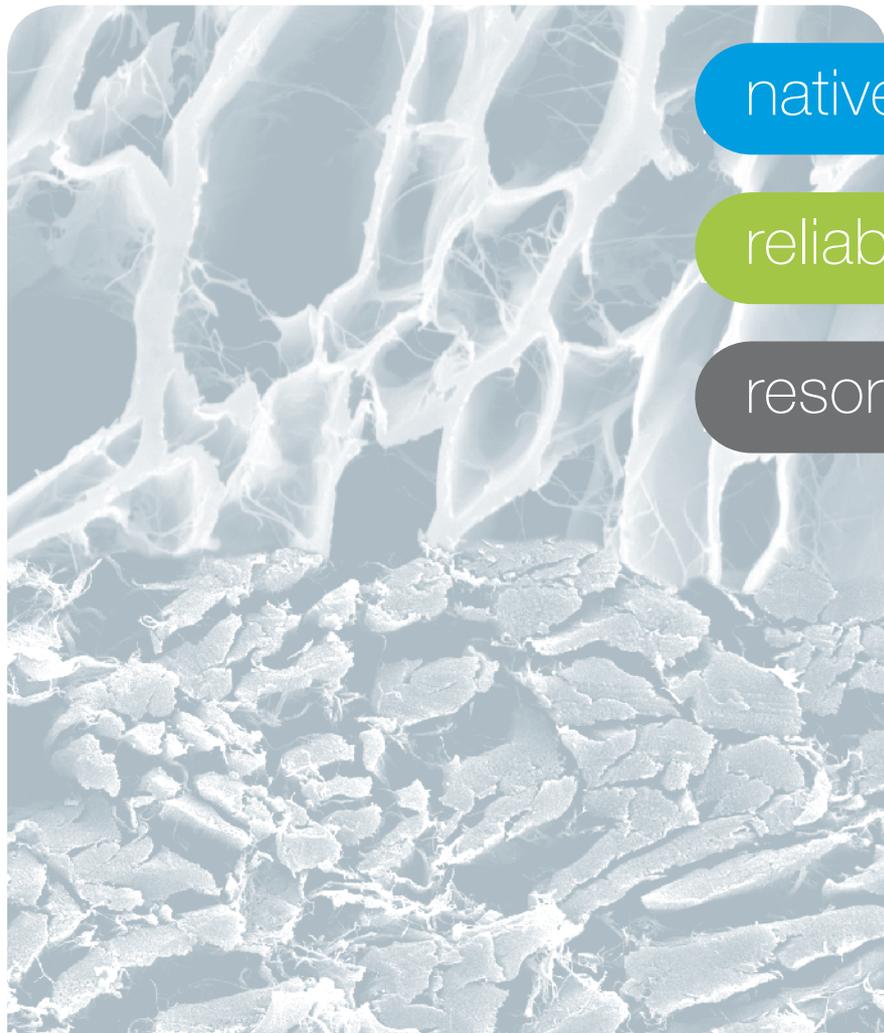
botiss
biomaterials

Jason[®] membrane & collprotect[®] membrane

Natural collagen membranes for GBR/GTR technique

Scientific and clinical evidence

soft tissue

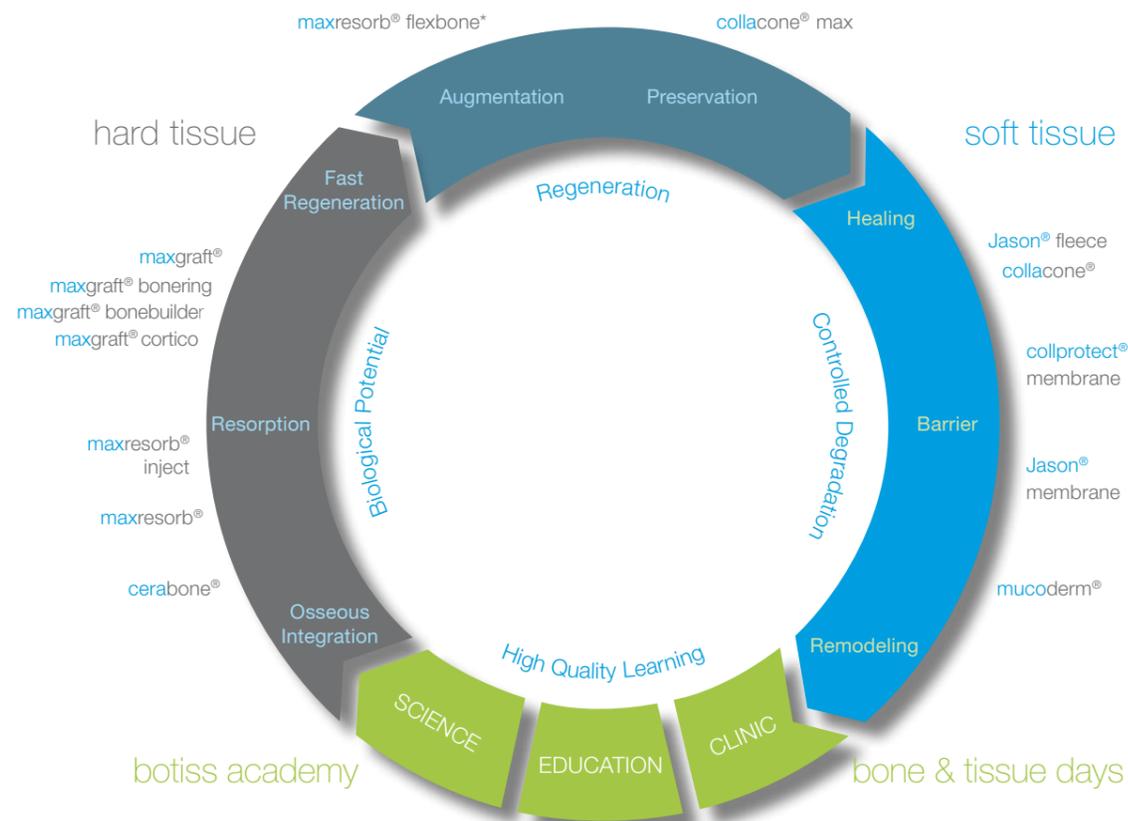


native

reliable

resorbable

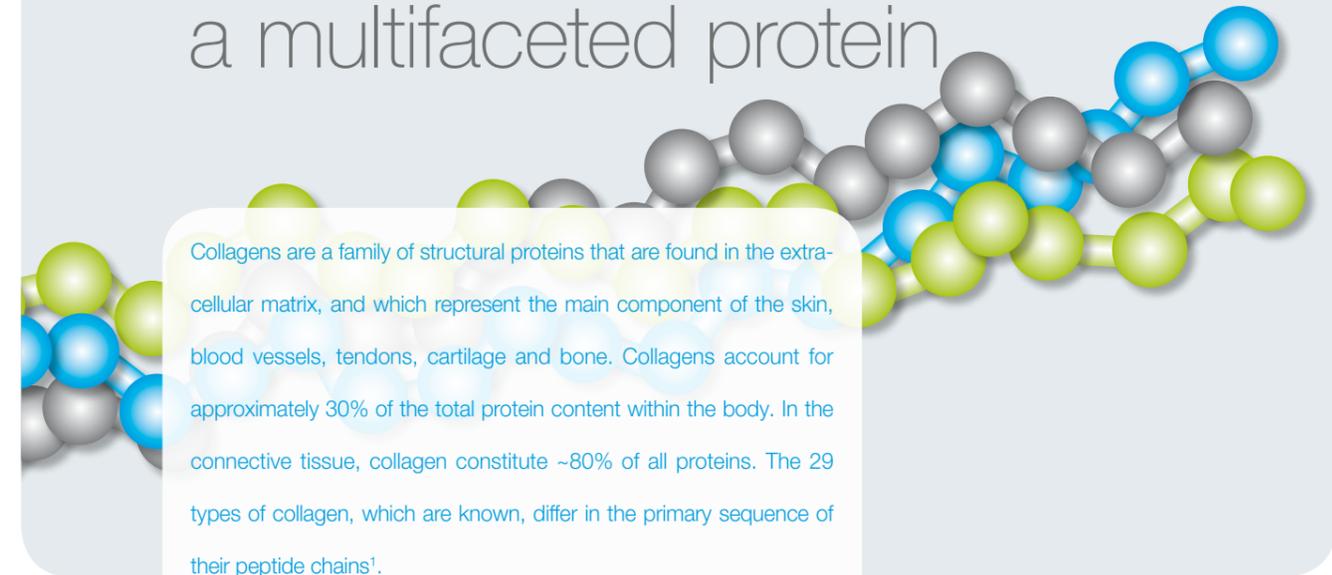
botiss regeneration system



Development / Production / Distribution

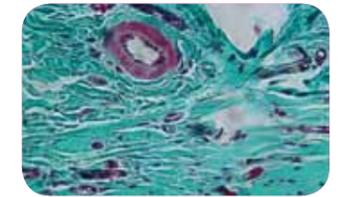
cerabone®	maxresorb®	maxresorb® inject	maxgraft® bonebuilder	maxgraft® bonering / maxgraft® cortico	maxgraft®
Natural bovine bone graft	Synthetic biphasic calcium phosphate	Synthetic injectable bone paste	Patient matched allogenic bone implant	Allogenic bone ring / Processed allogenic bone plate	Processed allogenic bone graft
maxresorb® flexbone*	collacone® max	Jason® fleece / collacone®	collprotect® membrane	Jason® membrane	mucoderm®
Flexible block (CaP / Collagen composite)	Alveolar cone (CaP / Collagen composite)	Collagenic haemostat (Sponge / Cone)	Native collagen membrane	Native pericardium GBR / GTR membrane	3D-stable soft tissue (Collagen) graft

Collagen – a multifaceted protein



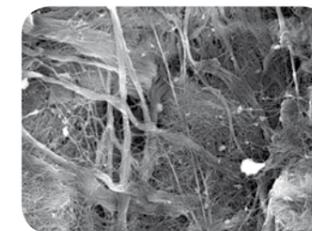
Collagens are a family of structural proteins that are found in the extracellular matrix, and which represent the main component of the skin, blood vessels, tendons, cartilage and bone. Collagens account for approximately 30% of the total protein content within the body. In the connective tissue, collagen constitute ~80% of all proteins. The 29 types of collagen, which are known, differ in the primary sequence of their peptide chains¹.

Three collagen molecules are twisted together into a triple helix, thus forming the collagen fibril. The fibrils aggregate and form collagen fibers. These fibers show a remarkable tear resistance, and provide the basis for the structural properties of many tissues, such as the tensile strength of tendons as well as the flexible properties of the bone. Collagens are synthesized by specialized cells such as fibroblasts and osteoblasts.



Histological staining of the skin showing the dense collagen network

Collagen types



Network of collagen fibers of a collagen fleece made of porcine dermis

Collagen type I is the most abundant protein in the body, with the largest quantitative share. It is a fibrous protein of the connective tissue, most frequently found in the skin, bone, tendons, ligaments and fibrous cartilage, but also in internal organs and their fibrous membranes, for example the pericardium and the peritoneum. Gingival connective tissue is composed of approximately 60% collagen type I. Other important collagens are collagen type II, III and IV. Collagen type II is an important component of the extracellular matrix found in hyaline- and elastic cartilage, while collagen type III is responsible for the elastic properties of blood vessels, the skin, and the lung. Collagen type IV is the major structural element of the basal lamina.

The most common types of collagen

collagen type I	skin, bone, tendons, ligaments, fibrous cartilage, cornea
collagen type II	cartilage (hyaline and elastic), spinal discs, vitreous body
collagen type III	skin, cardiovascular system
collagen type IV	basal lamina

¹ Brown and Timpi (1995). The collagen superfamily. *Int Arch Allergy Immunol* 107:484–490.

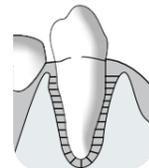
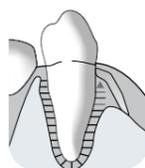
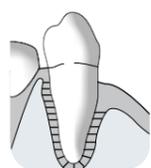
Collagen membranes for the GBR and GTR technique

The GBR and GTR technique

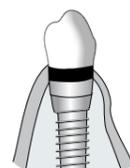
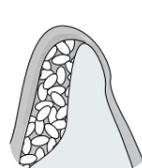
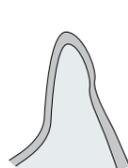
Collagen membranes have been used in Guided Tissue Regeneration (GTR) and Guided Bone Regeneration (GBR) for many years. The principle of these techniques is based on the placement of a barrier membrane for separation of slowly proliferating regenerative cell types, such as osteoblasts and periodontal cells, from fast proliferating epithelial and connective tissue cells, thus enabling the regeneration of lost tissue.

GTR aims at the regeneration of the periodontium. A barrier membrane is placed between the epithelium and the tooth, to provide space and time for regeneration of the periodontal ligament. In GBR procedures, membranes are normally applied in combination with a bone graft material. The membrane is placed over a bony defect filled with a bone graft material. The bone graft material prevents collapse of the membrane and serves as an osteoconductive scaffold for ingrowth of bone and precursor cells. The barrier membrane prevents migration of bone graft particles into the oral cavity and ingrowth of soft tissue into the defect area, thus enabling bony regeneration.

Guided Tissue Regeneration (GTR)



Guided Bone Regeneration (GBR)



Membrane types

The first generation of barrier membranes was based on non-resorbable materials e.g. cellulose acetate, titanium and expanded polytetrafluoroethylene (ePTFE). These membranes gained satisfying results but had disadvantages such as the secondary surgery required for removal, which is associated with graft site morbidity. To avoid the limitations of the non-resorbable membranes, resorbable membranes were developed. Resorbable membranes are either synthetic polymers such as polyglycolides, polylactides (acidic degradation) or animal-derived, e.g. collagen. Due to the manifold positive natural properties of collagen, collagen membranes are commonly the material of choice².

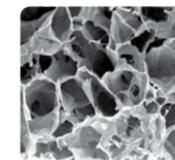
Barrier membrane requirements

- Biocompatibility
- Tissue integration
- Cell occlusiveness
- Dimensional stability
- Easy handling

² Rothamel et al. (2005). Biodegradation of differently cross-linked collagen membranes: an experimental study in the rat. *Clin Oral Implants Res* 16:369-378.

The advantages of collagen

Several factors make collagen an optimal biologic material for 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.



3D structure of a collagen fleece

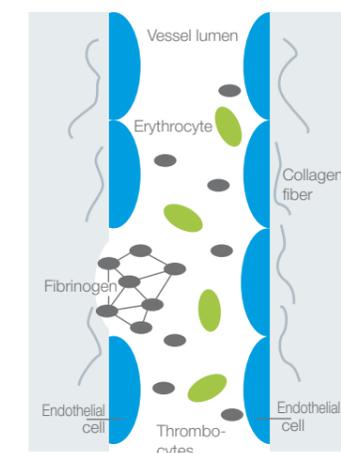
Collagens are resistant to any unspecific proteolytic degradation and are only degraded by specific enzymes called collagenases. Collagens are involved in the primary hemostatic reaction. Thus, collagen membranes contribute to a fast stabilization of the wound area. Another advantage of collagen is its 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 observed³.

Advantages of collagen membranes

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

Collagen as a natural hemostypt

Damage to the blood vessel wall leads to subendothelial collagen release. 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 wound⁴. 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, respectively.



³ Schwarz et al. (2006). Einsatz nativer und quervernetzter Kollagenmembranen für die gesteuerte Gewebe- und Knochenregeneration. *SCHWEIZ MONATSSCHR ZAHN MED* 116(11): 1112.

⁴ Nuyttens et al. (2011). Platelet adhesion to collagen. *Thromb Res* 127 Suppl 2:S26-9.

Origin of collagen membranes



The first collagen membranes available on the market were of bovine origin (Achilles tendon and pericardium). Nowadays, porcine membranes are more widely used because their usage excludes the risk of BSE transmission. Moreover, porcine collagen exhibits a high homology to human collagen and therefore a very low antigenicity. Due to these reasons, botiss membranes are exclusively produced from porcine collagen.

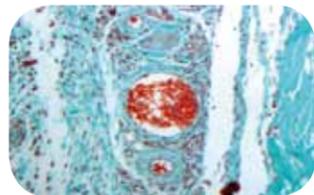
Collagen membranes may be derived from various tissues, ranging from dermis, to peritoneum and pericardium. Accordingly, these membranes differ in their handling and degradation properties, as well as their barrier function.

Properties of barrier membranes – vascularization versus barrier function

Many collagen membranes have a limited barrier function due to their rapid enzymatic degradation. The stability and barrier function of collagen membranes are tightly linked to the properties of the native tissue from which they originate. The Jason® membrane is produced from pericardium. Due to its structural characteristics it undergoes slow degradation and thus offers a prolonged barrier function. Furthermore, Jason® pericardium membrane is distinguished by its extraordinarily high tear resistance and excellent handling properties (e.g. good adaptation to surface contours, no sticking).



Despite its thinness, Jason® membrane exhibits an excellent multidirectional tear resistance.



Histology after subcutaneous implantation in rats demonstrating the presence of blood vessels within a collagen membrane

The barrier function may also be influenced by the density of the membrane. 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 desirable⁵.

One example of such a membrane is collprotect® membrane. This membrane possesses loosely structured areas (pores) that penetrate the compact collagen matrix and support a fast vascularization of the membrane.

⁵ 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.

Production process

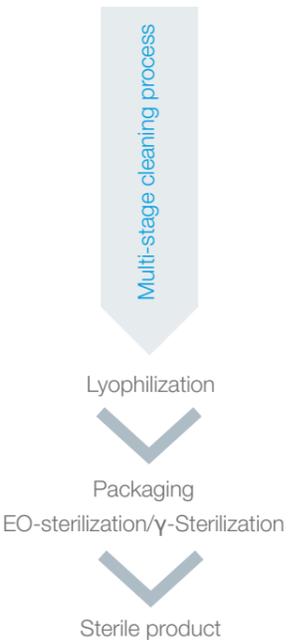


botiss membranes provide excellent handling and stability



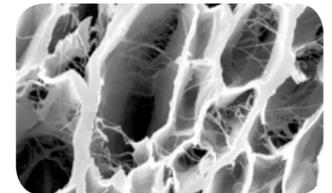
All botiss soft tissue products consist of natural porcine collagen originating from animals destined for the food industry and certified according to EN ISO 22442.

Pericardium Dermis



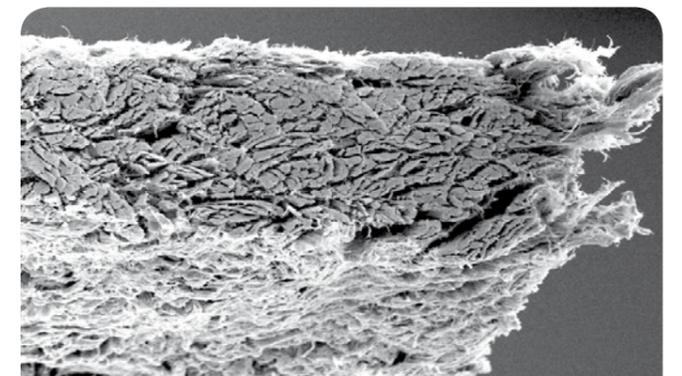
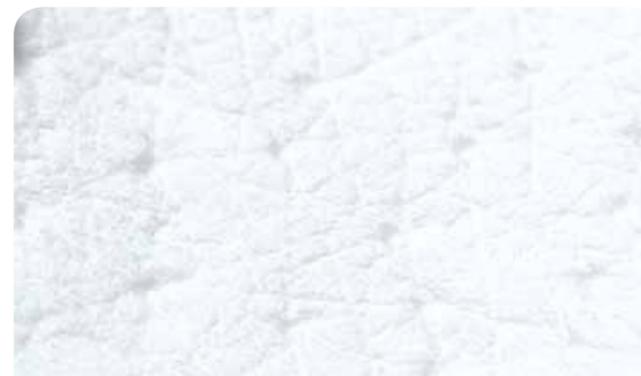
Jason® membrane collprotect® membrane

botiss' barrier membranes are native membranes, the natural properties of the original tissue (dermis or pericardium) being preserved during the production process. 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 solution).



Natural three-dimensional collagen network of Jason® membrane

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.

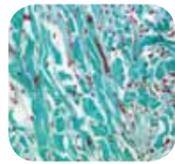


collprotect® membrane

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.



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

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



SEM image of collprotect® membrane

Properties

- Native collagen matrix with natural collagen structure
- Natural wound healing and blood clot support
- Easy application and handling in dry or wet status
- Rough and porous structure for cell guidance

Indications:

Implantology,
Periodontology,
Oral and CMF Surgery

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

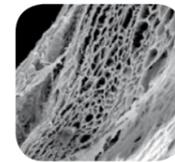


Jason® membrane

Native pericardium GBR/GTR membrane



Jason® membrane is a native collagen membrane obtained from porcine pericardium, developed and manufactured for dental tissue regeneration. The advantageous biomechanical and biologic properties of the natural pericardium are preserved during the production process.



SEM image of the Jason® membrane

Owing to these unique properties, Jason® membrane exhibits beneficial handling characteristics such as a remarkable tear resistance and effective surface adaptation. Due to its pericardial origin Jason® membrane also exhibits a long barrier function, making Jason® membrane our recommended choice particularly for large augmentative procedures.

Properties

- Natural long barrier function
- Native, ultra-thin membrane
- Easy handling, may be applied dry or wet
- Supple but strong, with exceptional adaptation to surface contours
- No stickiness after rehydration
- Multidirectional strength and tear resistance



Jason® membrane maintains the barrier function, 56 days after subcutaneous implantation in rats

Jason® membrane – excellent drapability and adaptation to surface contours

Indications:

Implantology,
Periodontology and
Oral and CMF Surgery

- Fenestration and dehiscence defects
- Sinus lift
- Protection of the Schneiderian membrane
- Socket and ridge preservation
- Horizontal and vertical augmentation
- Alveolar ridge reconstruction
- Intraosseous defects (1-3 walls)
- Furcation defects (class I and II)



Product comparison

Jason®
membrane

versus

collprotect®
membrane



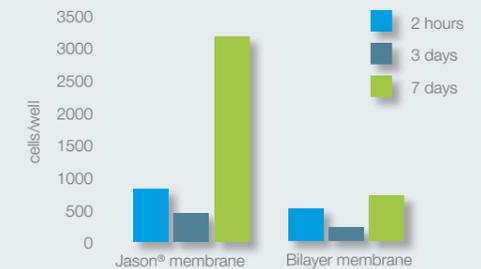
Pre-clinical testing

The Jason® membrane supports attachment and proliferation of osteoblast-like cells

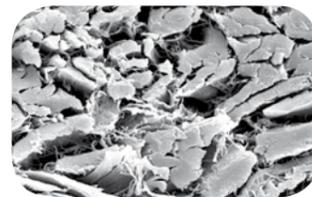
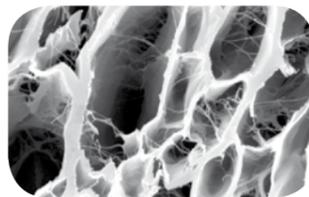
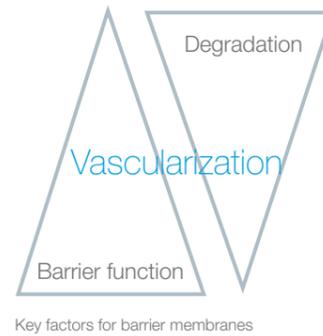
In vitro cell culture results. Dr. M. Herten, University of Münster and Prof. Dr. Dr. D. Rothamel, University of Düsseldorf⁷

Incubation of the multi-layered Jason® membrane and a competitive bi-layer membrane with osteoblast-like SaOs-2 cells showed a significantly higher cell proliferation on the Jason® membrane after seven days.

The excellent cell attachment and proliferation on the Jason® membrane highlights its suitability as scaffold for osteoblast guidance which supports of the bony regeneration of covered defects.



Origin	Pericardium	Dermis
Degradation	8-12 weeks in a rat model ⁶ , naturally long barrier function due to slow degradation	4-8 weeks in a rat model ⁶ , intermediate barrier function
Structure	Multi-oriented collagen fibres providing strong tear resistance	Dense network of collagen bundles with pores for better vascularization

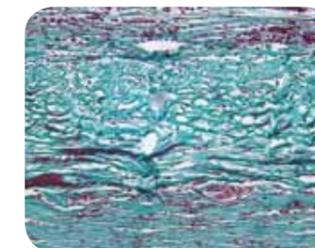


Product Specifications

Jason® membrane			collprotect® membrane		
Art.No.	Size	Content	Art.No.	Size	Content
681520	15 x 20 mm	1 membrane	601520	15 x 20 mm	1 membrane
682030	20 x 30 mm	1 membrane	602030	20 x 30 mm	1 membrane
683040	30 x 40 mm	1 membrane	603040	30 x 40 mm	1 membrane

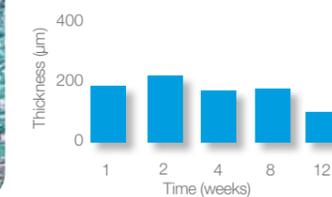
In vivo pre-clinical testing

Results from a degradation study in a rat model⁶, Prof. Dr. Dr. D. Rothamel, University of Düsseldorf

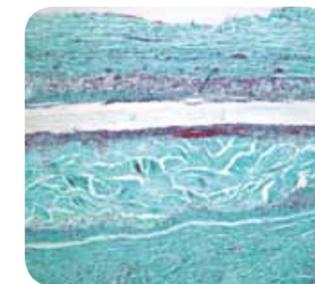


Structural integrity of the Jason® membrane 28 days after implantation

Degradation of Jason® membrane



The collprotect® membrane prepared for subcutaneous implantation



Only superficial cell invasion of the collprotect® membrane, 14 days after implantation

Degradation of collprotect® membrane



The diagrams display degradation times of the membranes, from *in vivo* data obtained in an experimental rat model.

Resorption time and tissue integration of collagen membranes not only depend on the animal origin, but also differ between tissues. Tissue integration and degradation of the Jason® membrane and the collprotect® membrane were tested by subcutaneous implantation in rats. Jason® membrane, which originates from pericardium, was integrated within the first weeks and remained stable for a healing period of eight to 12 weeks (please note the different metabolic rates for rats and humans).

The cell invasion of the dermal collagen of the collprotect® membrane took a little longer, but the membrane was mostly degraded within the first four to eight weeks.

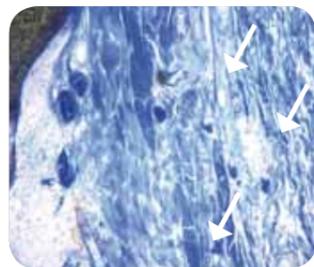
⁶ Rothamel et al. (2011). Biodegradation pattern of native and cross-linked porcine collagen matrices – an experimental study in rats. Poster EAO Athens, Greece.
⁷ Rothamel et al. (2012). Biocompatibility and Biodegradation of a Native, Porcine Pericardium Membrane. Results from *in vitro*/*in vivo* Examination Int J Oral Maxillofac Implants. 2012 Jan-Feb;27(1):146-54.

In vivo pre-clinical testing

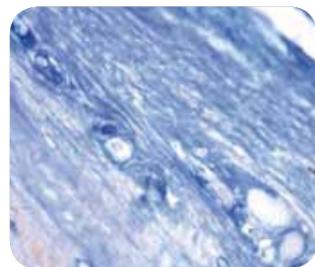
Jason® membrane – Excellent biocompatibility and tissue integration
Results from an animal model, Prof. Dr. Dr. D. Rothamel,
University of Düsseldorf⁷

Analysis of the tissue integration and morphological structure of the Jason® membrane at four to 12 weeks after lateral augmentation in a dog model.

The membrane was integrated into the surrounding tissue without any inflammation. Significant degradation of the membrane started at week eight and proceeded until week 12. A bilayer membrane that was tested in the same model showed a comparably good tissue integration, but was almost completely degraded after eight weeks.⁷



The Jason® membrane after four weeks healing time



The bilayer membrane after four weeks healing time

Four weeks healing time

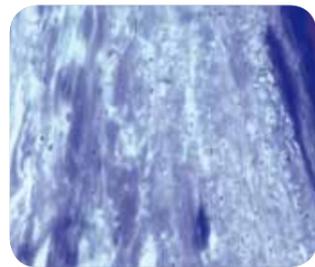
Both membranes showed good tissue integration without any inflammatory reaction, as demonstrated by Toluidine staining.

Initial ingrowth of blood vessels improves nutrition of the graft and osseous regeneration.

Eight weeks healing time

The bilayer membrane was almost completely resorbed.

Jason® membrane was still intact, serving as barrier against ingrowth of surrounding soft tissue.



The bilayer membrane after eight weeks healing time



The Jason® membrane after eight weeks healing time

12 weeks healing time

Jason® membrane was almost completely degraded and replaced by a periosteum rich in collagen fibers.

The collagen of the membrane is partially visible as cloudy fibrous areas.



The Jason® membrane after 12 weeks healing time

⁷ Rothamel et al. (2012). Biocompatibility and Biodegradation of a Native, Porcine Pericardium Membrane. Results from in vitro/in vivo Examination. Int J Oral Maxillofac Implants. 2012 Jan-Feb;27(1):146-54.

In vivo pre-clinical testing

collprotect® membrane – rapid angiogenesis and transmembranous vascularization
In vivo results from a rat model, Prof. Dr. Dr. D. Rothamel,
University of Düsseldorf⁸

One week after subcutaneous implantation of collprotect® membrane in rats, cells started to superficially invade the membrane.

No signs of inflammatory reactions were observed.

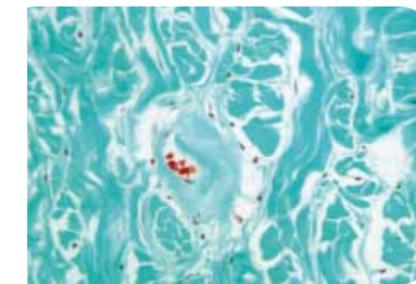
collprotect® membrane exhibits good integration into the well-vascularized peri-implant tissue.

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.

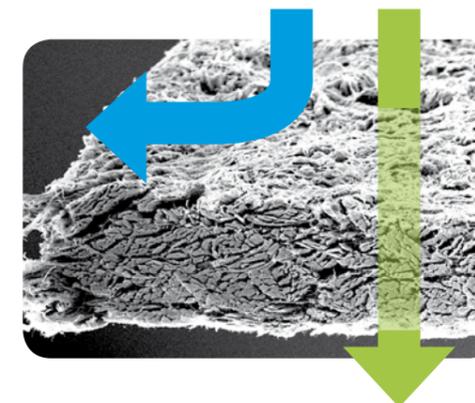
Seven days after implantation 28 days after implantation



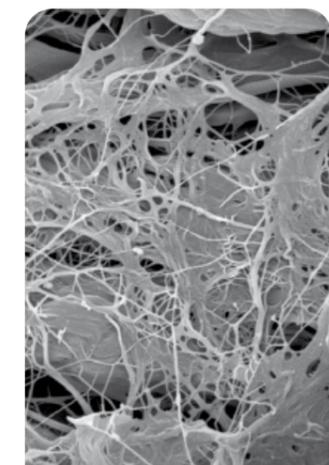
Seven days after implantation, only superficial invasion of cells into the membrane can be observed, an empty pore in the membrane in the lower left part is recognizable.



28 days after implantation, 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.



⁸ Rothamel et al. (2012). Clinical aspects of novel types of collagen membranes and matrices: Current issues in soft- and hard-tissue augmentation. EDI Journal 1/2012; p.64. Iofac Implants. 2012 Jan-Feb;27(1):146-54.

Clinical application of collprotect® membrane

Clinical case by 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



Pre-operative defect measurement



Pre-operative x-ray showing intrabony defect



Defect presentation after preparation of mucoperiosteal flap



Rehydration of cerabone® particles



collprotect® membrane cut to shape



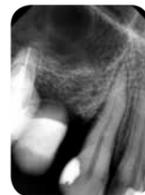
Filling of intrabony defect with cerabone®



collprotect® membrane in place



Wound closure



X-ray control at 12 months post-operatively



X-ray at 24 months post-operatively



Final prosthetic restoration

Clinical application of collprotect® membrane

Clinical case by Dr. Roland Török,
Nuremberg, Germany

Ridge augmentation



Clinical situation before augmentation, thin alveolar ridge



Surgical presentation of the atrophic alveolar ridge



Perforation of the cortical bone and insertion of screws to support placement of bone graft material



Placement of collprotect® membrane at the buccal wall



Ridge augmentation with maxresorb® and maxgraft®, mixture 1:1



Covering of augmentation site with PRF matrices



The collprotect® membrane turned down over defect



Situation after wound healing, at three months post-operatively



Stable integration of maxresorb® particles at re-entry three months post-operatively



Situation after removal of screws and preparation of the implant beds



Insertion of two implants into sufficient bone matrix



Tension-free wound closure

For lateral augmentation it is advantageous to place the dry membrane upright in the defect initially, and then fill the defect with a graft material. After rehydration, the membrane may be turned down over the defect.

Clinical application of collprotect® membrane

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 the collprotect® membrane to protect the Schneiderian membrane



Immediate implantation and 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 Jason® fleece



Wound closure and suturing



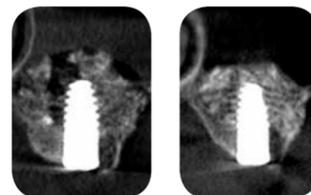
Satisfactory soft tissue situation after six months healing time



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 Jason® fleece is recommended to cover the barrier membrane in order to provide extra protection for the healing area. Where applicable, Jason® fleece can be loaded with antibiotics.

Clinical application of collprotect® membrane

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 mucosal flap



The maxgraft® bonebuilder



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



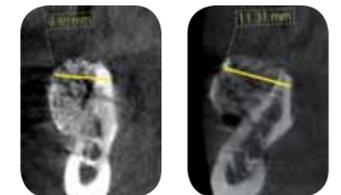
Placement of the collprotect® membrane and filling of the residual volume with cerabone®



Covering of the augmentation site with collprotect® membrane



Wound closure and suturing



CT scan of regio 36, 37 after surgery

To protect the Schneiderian membrane from damage, a membrane may be introduced before filling the sinus cavity with the bone graft material.

Clinical application of collprotect® membrane

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 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

Clinical application of Jason® membrane

Clinical case by Prof. Dr. Dr. Daniel Rothamel,
University of Düsseldorf, Germany

Sinus lift with two-stage implantation



Clinical situation before sinus lift



Clinical situation before sinus lift, occlusal view



Surgical presentation of the buccal wall



Preparation of a lateral sinus window



Introduction of Jason® membrane into the sinus cavity



The Jason® membrane placed in the sinus cavity to protect the Schneiderian membrane



Filling of the sinus cavity with maxresorb®



maxresorb® in the sinus cavity



Additional lateral augmentation with maxresorb®



Covering of the augmentation area with Jason® membrane



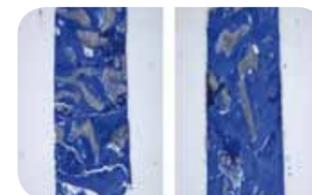
Tension-free wound closure with single button sutures



Excellent osseous integration of the maxresorb® particles without soft tissue ingrowth at re-entry, six months post-operatively



Stable insertion of two implants into sufficient bone matrix



Histological sections of biopsy taken at the time of implantation



Detailed image demonstrates complete integration of maxresorb® particles within the newly formed bony matrix



Post-operative radiograph

Clinical application of Jason® membrane

Clinical case by Dr. Sebastian Stavar,
Houten, Netherlands

Dehiscence defect



Initial clinical situation with broken bridge abutment in regio 12, tooth 21 not worth preserving and tooth 11 lost by a front teeth trauma several years ago



Situation after atraumatic tooth extraction and suturing of wound margins



Clinical situation five weeks after extraction



Preparation of a mucoperiosteal flap - extensive bone deficit in horizontal and vertical dimension



Horizontal and vertical augmentation with cerabone® and autologous bone after placement of two implants



Coverage of the augmentation site with Jason® membrane



Tension-free wound closure



Clinical view two weeks post-operatively



Complication free healing eleven weeks after augmentation



Exposure of implants and insertion of healing abutments



Shaping of the emergence profile using the temporary prosthesis



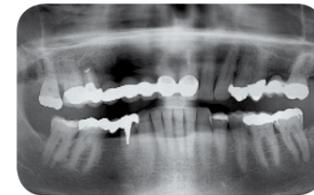
Final prosthetic restoration with implant-borne bridge in regio 12-21 and crown on tooth 22

When using bone graft materials, the application of a barrier membrane is highly recommended to prevent the fast proliferating soft tissue from hindering complete osseous regeneration of the defect.

Clinical application of Jason® membrane

Clinical case by Prof. Dr. Dr. Daniel Rothamel,
University of Düsseldorf, Germany

Ridge augmentation



Instable bridge situation with abscess formation at tooth 15 after apicoectomy



OPG six months after tooth extraction shows vertical deficiency at tooth 15



Clinical situation showing scar tissue formation at former abscess incision site



Mucoperiosteal flap elevation reveals a self-containing defect at tooth 15 and a non-containing lateral bone defect at teeth 14 to 12



Bone spreading at tooth 12 for lateral widening of the crest



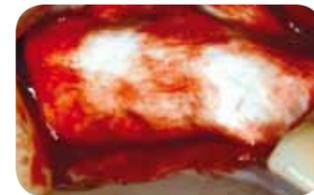
Internal sinus grafting to compensate the vertical deficiency at tooth 15



After implant installation, lateral bone defects require further augmentation



Application of cerabone® and autologous bone (mixture 1:2) on the lateral aspect



Covering of the augmentation site with Jason® membrane



Tension-free soft tissue closure



Post-operative x-ray showing the internal sinus grafting and implant positions



Stable soft tissue condition after six months of healing



Perfect integration of the cerabone® particles into the newly formed bone matrix



Implant uncovering, and insertion of gingiva formers



Prosthetic situation following professional dental hygiene treatment at one year post-operatively



Radiological situation at one year post-operatively

Clinical application of Jason® membrane

Clinical case by Prof. Dr. Dr. Daniel Rothamel,
University of Düsseldorf, Germany

Lateral augmentation



Lateral defect in regio 24 at six months after extraction



Crestal view of defect



Surgical presentation of the bone defect



Thin buccal bone after implant installation



Dehiscence defect at palatal side



Lateral augmentation with cerabone® and autologous bone (mixture 1:1)



Further augmentation at the palatal side



Application of Jason® membrane



Soft tissue closure



Clinical situation after three months



Satisfactory bone formation and volume maintenance



Stable hard tissue conditions on both buccal and palatal side

Studies have shown that the highest implant survival rates with the GBR technique are achieved when combining the use of a bone graft material and a barrier membrane.

Clinical application of Jason® membrane

Clinical case by Prof. Dr. Dr. Daniel Rothamel,
University of Düsseldorf, Germany

Sinus lift with two-stage implantation



Pre-operative OPG showing vertical and lateral defect after cystectomy and tooth extraction



Situation before surgery



Surgical presentation of the atrophic alveolar ridge



Preparation of a lateral sinus window



Filling of the sinus cavity with cerabone®



Additional lateral augmentation with cerabone®



Covering of the augmentation site with Jason® membrane



Tension-free wound closure



OPG six months post-operatively



Excellent integration of cerabone® particles without soft tissue ingrowth



Stable implant insertion



Histology of biopsy, showing cerabone® particles covered by newly formed bone matrix

Small perforations (<5 mm) of the Schneiderian membrane during sinus floor elevation may be covered with a collagen membrane. The patient should be prescribed antibiotics and prophylaxis against swelling (e.g. Xylomethazoline), and must avoid sneezing for two weeks. The treatment must be terminated in case of an acute sinusitis with the presence of pus.

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