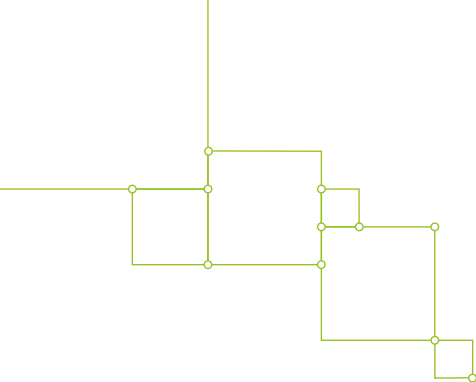




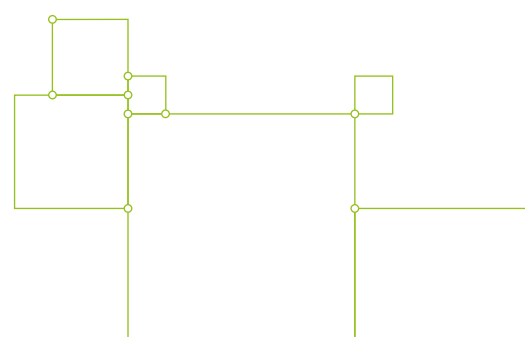
biotrics
BIOIMPLANTS

biocade[®] dura

Transparent collagen matrix
for duraplasty



neurosurgery



biotrics **BIOIMPLANTS**

biotrics bioimplants AG is a private, German, biomedical company, specialized in clinical regeneration of human bone and soft tissues. Biotrics develops, produces and markets innovative and established regeneration matrices made of collagen and magnesium for various surgical applications.

Our innovative, indication-optimized technologies and products are based on many years of academic and industrial research, together with leading clinicians, research institutes and universities. All products are manufactured in our own factory in Berlin-Tempelhof under highest quality and scientific standards and are certified accordingly.

Our expertise lies in the biological functionality, safety and reliability of our products - and thus in reliable treatment.

As an innovative biotech company, we invest substantially in research, production and clinical exchange - The result is innovative products such as biocade® and biocade® dura.

Join us on our mission "Regenerate instead of substitute". We invite you to share your experiences, suggestions and also criticisms with us. Together, we can develop new product and treatment concepts that will optimally support you in your daily clinical challenges.

"At biotrics, innovation is combined with many years of expertise - everything makes sense, which convinced me to work with the team."

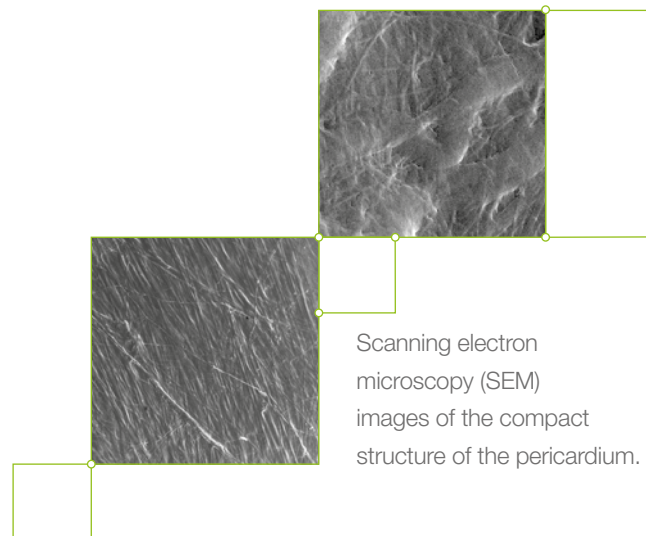
Dr. Ignacio Stöwe

biocade® dura

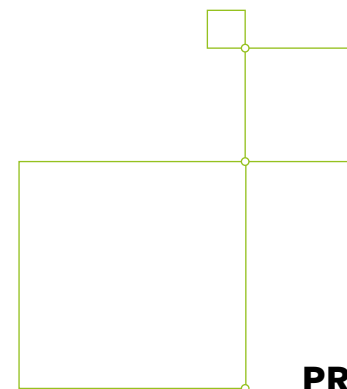
biocade® dura:
transparent and
pliable

biocade® dura was designed to optimally support neurosurgeons in their daily challenges.

biocade® dura is easy and wide to use in duraplastics and also offers reliable biological functionality.



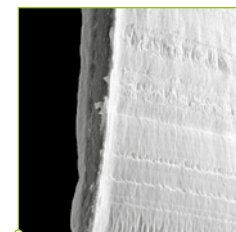
Scanning electron microscopy (SEM) images of the compact structure of the pericardium.



Transparent collagen matrix for duraplasty

PROPERTIES

- Native, transparent collagen matrix for inspection of the subdural situation
- No preservatives or crosslinkers
- Supports adhesion and proliferation of regenerative cells
- Long absorption profile provides time for neodura formation
- CSF-tight and tear-resistant
- Pliable after a short rehydration for wrinkle-free fixation
- Not self-adherent, low product volume
- Very thin (<0.1 mm)



biocade® dura is versatile and can be used in a wide range of indications – e.g. when a primary dura closure is not possible.

biocade® dura can be adapted to the desired size using standard techniques.

The short rehydration time makes biocade® dura convenient and quick to use. biocade® dura allows repositioning and, since it does not adhere to itself, it can also be inserted through a trocar.

biocade® dura allows the surgeon to choose between suturing or gluing.

After the implantation of biocade® dura, regenerative cells are attracted, and their proliferation and migration are supported by the native collagen. biocade® dura serves as a scaffold structure, which is completely degraded by physiological processes during the formation of a neodura.

Thanks
to transparency, the essentials are in view

Due to the transparency, the situs can be monitored at all times and subdural hemorrhages can be detected at an early stage.

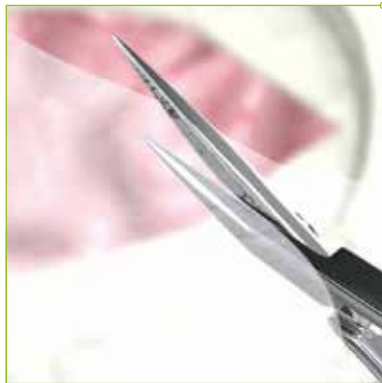
biocade® dura is very thin, follows the contours, and is therefore very easy to handle. Due to its compacted collagen structure it is waterproof and has a prolonged resorption profile.

Possible indications for biocade® dura

- Chiari malformations
- (Rhino)liquorrhea (in onlay, underlay or sandwich technique)
- After removal of tumors, cysts or spinal CSF fistulas

„The ideal dura replacement material does not yet exist -
but biocade® dura already has a lot of it:
user-friendly to handle, firm to suture, liquid-tight and transparent -
that's exactly where we want to go.“

Dr. med. Hilal Yahya



biocade[®] dura

From the product idea
to the certified product –

**EVERYTHING FROM A
SINGLE SOURCE.**

At biotrics, we combine more than 10 years of experience in the development and production of collagen matrices. Our development always follows the needs of the user and is tailored to the clinical requirements.



Preservation of
the outstanding properties

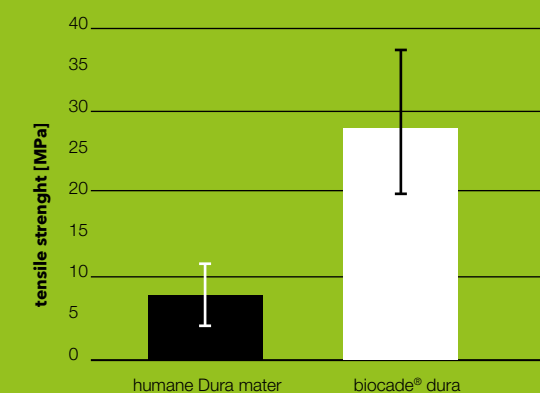
THE NATIVE PERICARDIUM

The unique manufacturing process intensively purifies and preserves the properties of the porcine pericardium. biocade[®] dura thus retains its natural collagen type I content and combines considerable tensile strength with an excellent barrier function. The deliberate absence of artificial cross-linking agents or preservatives ensures the proven tissue friendliness of biocade[®] dura.

Jung O, Radenkovic M, Stojanovic S, et al.. In Vitro and In Vivo Biocompatibility Analysis of a New Transparent Collagen-based Wound Membrane for Tissue Regeneration in Different Clinical Indications. In Vivo. 2020 Sep-Oct;34(5):2287-2295.

TENSILE STRENGTH

The tensile tests show that biocade[®] dura provides sufficient tensile strength to withstand physiological stress.



Physiological data taken from: Zwirner J, Scholze M, Waddell JN, et al. Mechanical Properties of Human Dura Mater in Tension - An Analysis at an Age Range of 2 to 94 Years. Sci Rep. 2019 Nov 13;9(1):16655.

„Our tissues consist largely of collagen - so for me, alternative collagen matrices that are similar to this tissue are “indispensable” in order to achieve physiological integration of the replacement material and healing with few complications and thus regeneration.“

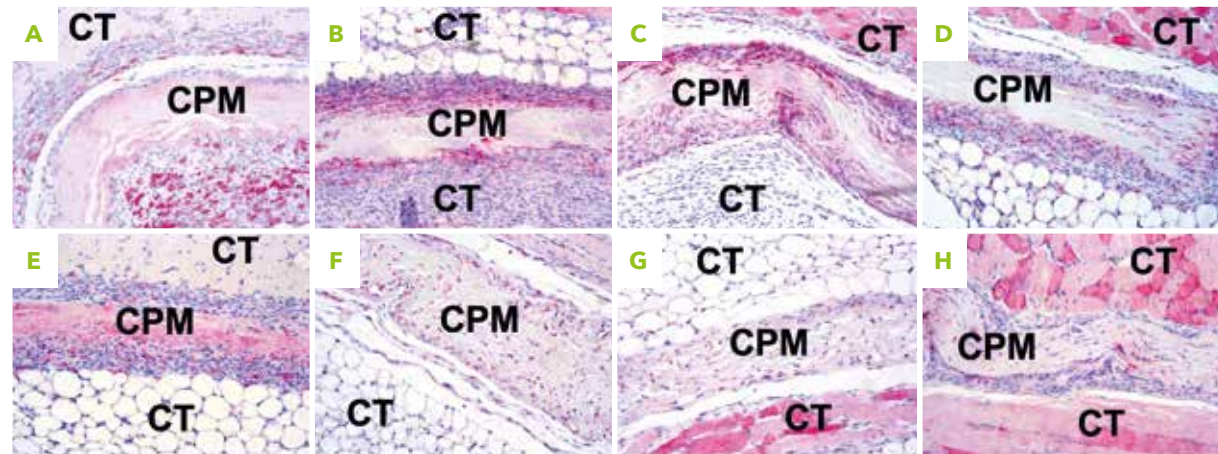
Dr. rer. nat. Mike Barbeck

Long resorption profile

Histomorphometric investigations up to 90 days show the long resorption profile without abnormalities.

biocade® **dura** degrades slowly, indicating a long barrier effect.

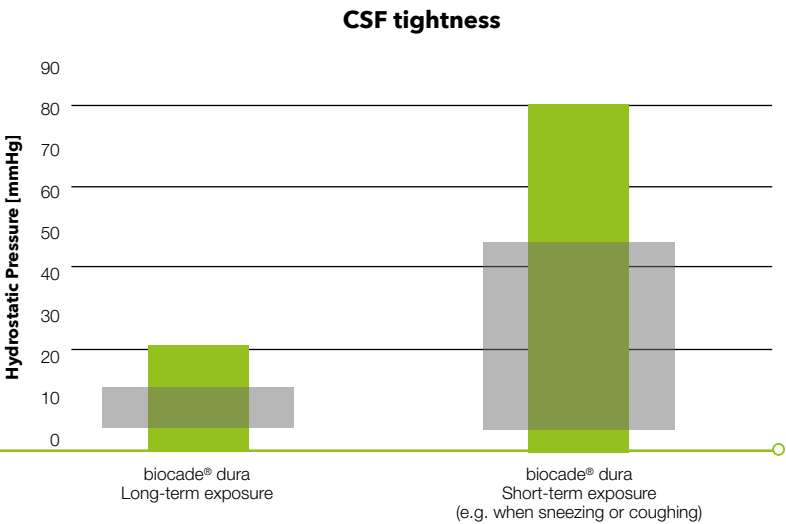
Pro-inflammatory M1 macrophages or anti-inflammatory M2 macrophages after 10, 30, 60, and 90 days, respectively. (A, C, E, G and B, D, F, H, respectively). Abbreviations: CPM – compacted pericardium-based membrane, CT – sub-cutaneous connective tissue.



Gueldenpfennig T, Houshmand A, Najman S, et al. The Condensation of Collagen Leads to an Extended Standing Time and a Decreased Pro-inflammatory Tissue Response to a Newly Developed Pericardium-based Barrier Membrane for Guided Bone Regeneration. In Vivo. 2020 May-Jun;34(3):985-1000.

Cerebrospinal fluid (CSF) tight

The pressure load tests show that biocade® dura maintains CSF tightness at physiological intracranial pressures.



Physiological data (grey) taken from: Hrsg. Prange H, Bitsch A: Neurologische Intensivmedizin - Praxisleitfaden für Neurologische Intensivstationen und Stroke Units. 12. Auflage. Thieme Verlag 2004. DOI: 10.1055/b-002-11378.



Porcine pericardium **AS BIOMATERIAL**

> 80 SCIENTIFIC AND CLINICAL PUBLICATIONS
on porcine pericardial membranes

INTENSIVELY RESEARCHED,
WIDELY USED



Case 1 | Patient: m, 83 years old

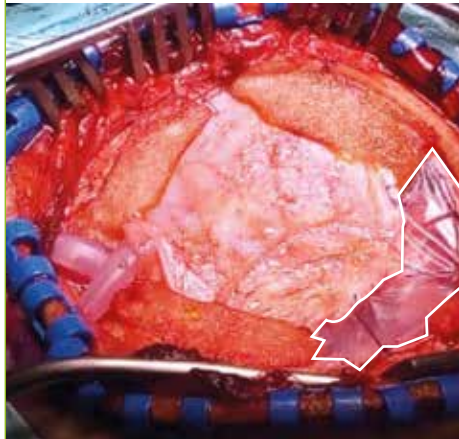
Duraplasty after removal of a traumatic subdural haematoma, parietal, with compression on 6th ventricle.



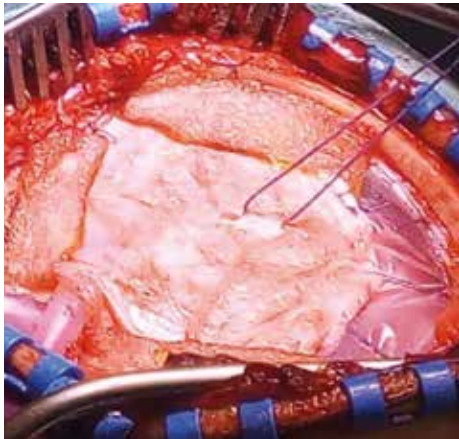
Crescent-shaped dural defect after trauma flap, attachment of the retaining sutures.



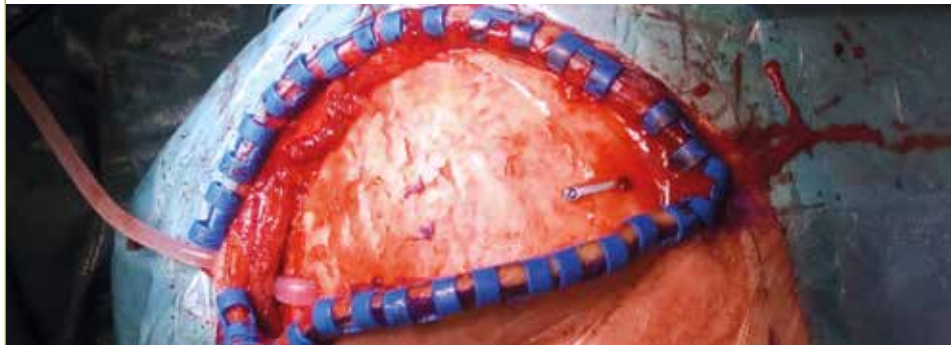
Continuous suture on the outer edge, biocade® dura placed subdurally.



Positive leak test. No leakage of liquid.



Preparation for bone flap fixation.



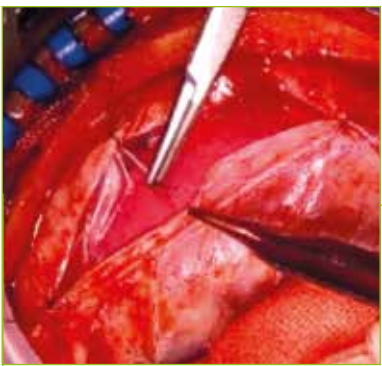
Bone flap repositioned and fixed. No CSF leaks.

Postoperative:

Good clinical development. No CSF leakage or signs of rejection.

Case 2 | Patient: f, 81 years old

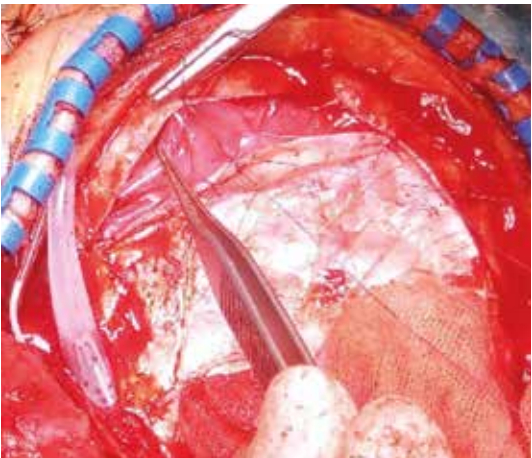
Duraplasty as part of an emergency operation following the removal of a bilateral subdural haematoma, with parts of subarachnoid haemorrhage, oedematous swollen brain tissue and clear signs of cerebrospinal fluid circulation disorders.



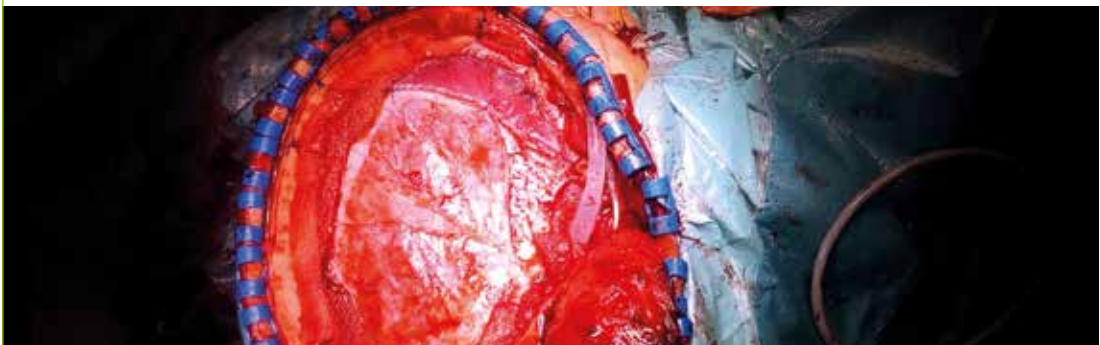
Placement of the retention sutures, biocade® dura placed under the dura. Elasticity of the biocade® dura allows it to be adapted to the defect.



Tear resistance of biocade® dura allows tension during suturing.



The transparency ensures that subdural haemorrhages can be recognised as early as possible. The directly underlying cortex is clearly visible under biocade® dura.



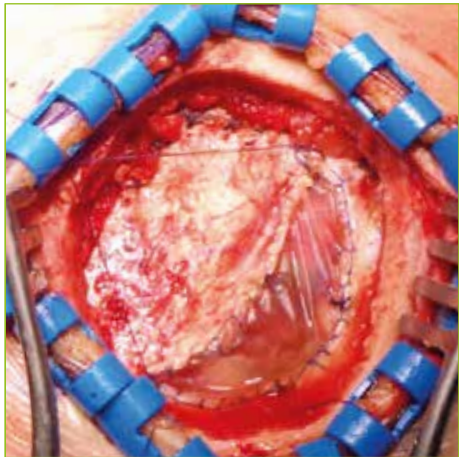
Good handling properties allows for continuous suture technique. Liquor-tight suture achieved without additional sealing materials.

Postoperative:

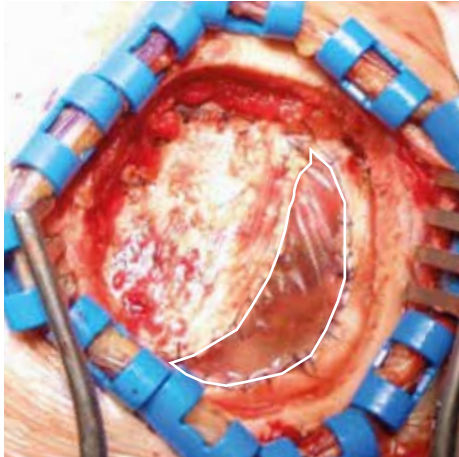
Neither signs of rejection nor CSF leakage.

Case 3 | Patient: f, 60 years old

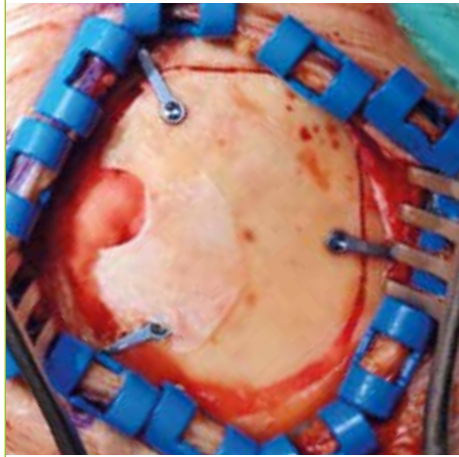
Duraplasty as part of an emergency operation to remove right frontal cerebral oedema with ventricular collapse in all ventricles, midline shift to the left, and occlusive hydrocephalus resulting from a local wound healing disorder due to secretion following glioblastoma surgery.



Application of biocade® dura in underlay technique and placement of retaining sutures. biocade® dura shows good adaptability due to relative elasticity, allowing the defect to be bridged with a precise fit.



The subdural space is filled with fluid, and the dura bulges outward. Even without additional sealing, biocade® dura is watertight sealed and elastic. Additionally, the subdural space is clearly visible thanks to the transparency of biocade® dura.



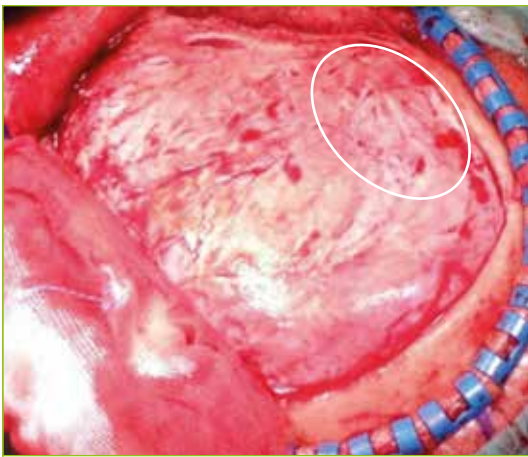
The bone flap is repositioned and fixed in place.

Postoperative:

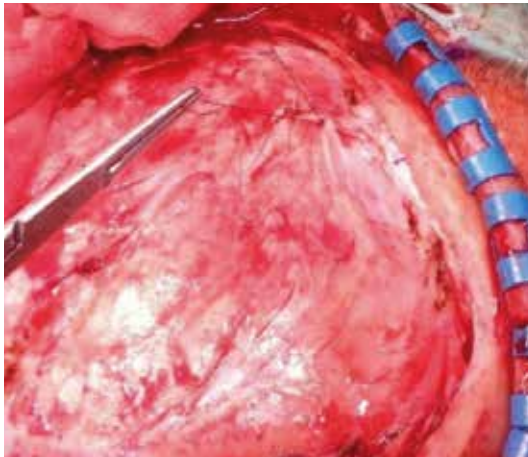
No postoperative complications

Case 4 | Patient: m, 64 years old

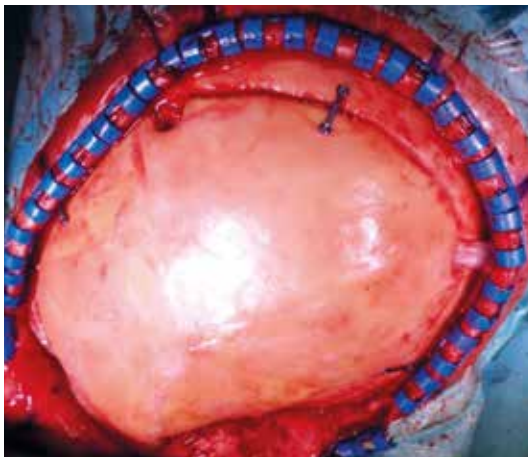
During bone flap repositioning and fixation following decompressive hemicraniectomy and dural expansion treated with biocade® dura, it was observed that biocade® dura was fully resorbed and a neodura had formed 4.5 months after the initial surgery.



Surgical site on healed duraplasty: biocade® dura has been completely transformed into neodura without complications. Hardly any difference between the native dura and the healed biocade® dura (white oval) is recognizable.



Preparation of retaining sutures for bone flap repositioning – the neodura is highly elastic and watertight.



The bone flap is repositioned and fixed in place.

Postoperative:

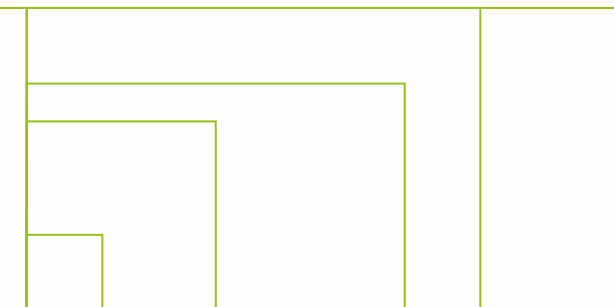
No postoperative complications

biocade[®] dura

Transparent collagen matrix
for duraplasty

Art. No.	Dimension	Contents
750001	1 x 1 cm	1 Membrane
750002	2,5 x 2,5 cm	1 Membrane
750003	3 x 5 cm	1 Membrane
750004	4 x 6 cm	1 Membrane
750005	4 x 8 cm	1 Membrane

One Size doesn't fit all





Innovation. Regeneration. Strictly biologic.

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