INTEGRA™

DuraGenPlus®

Adhesion Barrier Matrix

Distribute Outside USA Only

U.S. Patent 5,997,895

CE 0086

ENGLISH

DURAGEN PLUS®
ADHESION BARRIER MATRIX

Instructions for Use

DESCRIPTION

DuraGen Plus® Adhesion Barrier Matrix is an absorbable implant for repair and restoration of dural defects and as an adhesion barrier for the reduction of peridural fibrosis. DuraGen Plus matrix is an easy to handle, soft, white, pliable, nonfriable, porous, collagen matrix. DuraGen Plus matrix is supplied sterile, nonpyrogenic, for single use in double peel packages in a variety of sizes.

INDICATIONS FOR USE

DuraGen Plus Adhesion Barrier Matrix is indicated as an onlay graft for the repair and restoration of dural defects in cranial and spinal surgical procedures. DuraGen Plus matrix is also indicated as an adhesion barrier for the inhibition of post-surgical peridural fibrosis.

DuraGen Plus matrix readily conforms to the surface of the brain, spinal cord and overlying tissues. DuraGen Plus matrix may be used to close dural defects following traumatic injury, excision, retraction or shrinkage. DuraGen Plus matrix may be used to supplement primary closure.

In clinical evaluations, DuraGen Plus matrix has been demonstrated to be an effective dural graft matrix for the following procedures:

- Cranial Convexity: may be used to cover large defects following surgery, especially for dural loss from excision, contraction, retraction and/or shrinkage;
- Brain Swelling: intra-operative brain swelling or anticipated postoperative swelling;
- Posterior Fossa Surgery: 1) General use as a dural graft, 2) decompression craniectomy and dural release for infarcts, i.e., Posterior Inferior Cerebellar Artery (PICA) infarcts, 3) anticipated swelling after trauma, and 4) may be used in Chiari decompression procedures;
- Spinal Surgery: 1) General use as a spinal onlay dural graft, especially useful for defects arising from pinhole tears, disc surgery, and spinal stenosis decompression, 2) after resection of intradural tumors, 3) onlay graft after dural approximation with sutures, 4) as a separation layer between the dura and overlying tissues;
- Adhesion Barrier: To inhibit post-surgical peridural fibrosis in laminectomy, laminotomy or discectomy procedures where nerve roots are exposed.

MODE OF ACTION

DuraGen Plus matrix is designed as an onlay graft for the repair and restoration of dural defects in cranial and spinal surgery and as an adhesion barrier for the inhibition of post-surgical peridural fibrosis.

Upon implantation, DuraGen Plus matrix provides a scaffold for the infiltration of fibroblasts and a substrate for the deposition of new collagen. When used as a dural graft the DuraGen Plus matrix is gradually absorbed and replaced by endogenous connective tissue. DuraGen Plus matrix remains intact as an adhesion barrier between adjacent tissues prior to absorption.

Histological evaluation of post-implantation specimens from 100 patients demonstrated that fibroblasts penetrate into and proliferate within the collagen matrix. The porous structure of the collagen matrix facilitates the ingrowth of fibroblasts into the collagen matrix graft. Fibroblasts were observed on the collagen matrix fibers that provided a scaffold for the deposition of new collagen. This pattern of fibroblastic proliferation into the collagen matrix was initiated as early as 4 days post implantation and was well established by 15 days. Encapsulation of the matrix and/or neomembrane formation were not observed. In samples examined after 1 year and up to 5 years postoperatively, the collagen matrix was fully collagenized and incorporated into the dura. Encapsulation, delayed hemorrhage or pseudotumor formation did not occur.

CONTRAINDICATIONS

DuraGen Plus matrix is not designed, sold or intended for use except as described in the indications for use and is contraindicated in the following situations:

- For patients with a known history of hypersensitivity to bovine - derived materials.
- For primary repair of spinal neural tube defects; anterior spinal surgery with dural resection (e.g., transoral surgery).
- Should be used with caution in infected regions.
- Not recommended to cover dural defects involving mastoid air cells.
- Not recommended for large defects at the skull base following surgery.

INSTRUCTIONS FOR USE

Preparation

- DuraGen Plus matrix is packaged in a double peel package. Peel open the outer package. The inner package is sterile and may be placed on the sterile field.
- Rinse surgical gloves, if necessary, to remove any glove powder prior to touching the product.

- Remove product from package using a gloved hand and aseptic technique so as not to crush the matrix.

For Use as a Dural Graft

- DuraGen Plus matrix, in the dry state, can be cut to the desired shape using aseptic technique. The DuraGen Plus matrix graft must be large enough to overlap the remaining dura by a minimum of one (1) centimeter.
- Apply dry with either side towards the brain or neural tissue and then moisten with saline.
- DuraGen Plus matrix can be repositioned as necessary.
- DuraGen Plus matrix is an onlay graft and does not require sutures, however, tensionless, atraumatic stay sutures may be used if desired.
- Closed suction wound drainage is recommended for 1–3 days post–operatively, if dural defects are present or suspected.
- Discard any unused pieces of DuraGen Plus matrix.

For Use as an Adhesion Barrier

- DuraGen Plus matrix, in the dry state, can be cut to the desired shape using aseptic technique. The DuraGen Plus matrix must be large enough to entirely cover the exposed tissues that require protection from adhesion formation.
- Apply dry or moisten with saline before application. Rehydration is desirable before application where the DuraGen Plus matrix is being used to wrap anatomical structures or where the surgical site is confined.
- DuraGen Plus matrix can be repositioned as necessary.
- DuraGen Plus matrix is an onlay adhesion barrier and does not require sutures, however, fibrin glue or tensionless, atraumatic stay sutures may be used to anchor the material in situ, if desired.
- Discard any unused pieces of DuraGen Plus matrix.

SAFETY

DuraGen Plus matrix is manufactured from collagen obtained from bovine deep flexor tendon, which is classified by European Standards as a Category C material (no detectable infectivity for Bovine Spongiform Encephalopathy (BSE)). Bovine Tendon is known to be one of the purest sources of Type I collagen that is commercially available.

The collagen used to manufacture DuraGen Plus matrix is currently used in the manufacture of an artificial skin, absorbable hemostatic sponges, and absorbable

wound dressings. The manufacturing process for DuraGen Plus matrix meets USA and European Standards for animal tissue sourcing, handling and inactivation of viruses and transmissible agents. This process involves a treatment with sodium hydroxide that is a recognized method of inactivation of Spongiform Encephalopathy pathogens.

A viral inactivation study for the DuraGen Plus matrix manufacturing process was conducted by an independent certified laboratory. In this study, the sodium hydroxide reduced the viral titer to non-detectable levels for the following viral strains: Human Immunodeficiency Virus Type I (HIV), Bovine Viral Diarrhea (BVD), Infectious Bovine Rhinotracheitis (IBR), Parainfluenza Virus Type 3 (PI3), Vesicular Stomatitis (VSV).

WARNINGS

- Do not resterilize!
- Do not use if the product package is damaged or opened.
- DuraGen Plus matrix is generally not recommended for extensive skull base surgery with dural resection; however, DuraGen Plus matrix can be used to augment other forms of specific repair (i.e., Fascia lata).

PRECAUTIONS

- There exists potential for adhesion formation if there is disruption of the pia-arachnoid and/or in the presence of infection.
- Rinse surgical gloves to remove any glove powder prior to handling DuraGen Plus matrix.
- If DuraGen Plus matrix is to be sutured, tensionless suturing technique must be used to prevent tearing the DuraGen Plus matrix.
- The DuraGen Plus matrix graft should be cut to size ensuring an overlap to cover the existing dura.
- Use caution when using DuraGen Plus matrix in conjunction with surgical sealants. Clinical experience suggests that there may be an increased risk of cerebrospinal fluid (CSF) leakage in these situations.
- Fibrin glue may be used with caution as an adjunct to repair, especially if used in skull base procedures or intradural spinal surgery.

ADVERSE EVENTS

Possible complications can occur with any neurosurgical procedure and include cerebrospinal fluid leaks, infection, delayed hemorrhage and adhesion formation. In a clinical evaluation involving 1096 patients, postoperative wound infection rates for collagen graft matrix were reported at approximately the same rate as the control group. Postoperative cerebrospinal fluid leaks were reported in 3 of 67

patients who underwent intradural posterior fossa procedures. Macroscopic evaluations revealed minimal adhesion formation only when there was significant disruption of the pia-arachnoid. There were no reports of graft encapsulation, neomembrane formation or foreign body reactions. There were no reports of graft rejection at histology.[1]

In a clinical study evaluating DuraGen matrix as an adhesion barrier, there were no reoperations in the DuraGen treated group performed as a result of adverse events attributable to the use of DuraGen and no complications resulting from surgical wound infection occurred in this group. No patients developed a cerebrospinal fluid leak during follow-up. No unanticipated adverse events were reported in this study.

[1] Data on file at Integra LifeSciences Corporation

SINGLE-USE DEVICE

DuraGen Plus Adhesion Barrier Matrix is supplied in a single-use package and is guaranteed to be sterile and non-pyrogenic unless opened or damaged. The product is intended for use as an absorbable implant and is not to be reused. Reuse of the device can result in contamination and/or disease transmission.Any attempt to resterilize or reuse the product/components will damage the matrix and impair its ability to function as intended. All unused pieces must be discarded.

STORAGE

Store at room temperature.

HOW SUPPLIED

DuraGen Plus Adhesion Barrier Matrix is supplied sterile, in single use, double peel packages in a variety of sizes. Contents of the package are guaranteed sterile and nonpyrogenic unless the package is opened or damaged.

Reference Number	Size	Quantity
DP-1011-I	*2.5 cm x 2.5 cm (1 in x 1 in)*	*single unit*
DP-5011-I	*2.5 cm x 2.5 cm (1 in x 1 in)*	*5 units/box*
DP-1013-I	*2.5 cm x 7.5 cm (1 in x 3 in)*	*single unit*
DP-5013-I	*2.5 cm x 7.5 cm (1 in x 3 in)*	*5 units/box*
DP-1022-I	*5 cm x 5cm (2 in x 2 in)*	*single unit*
DP-5022-I	*5 cm x 5 cm (2 in x 2 in)*	*5 units/box*
DP-1033-I	*7.5 cm x 7.5 cm (3 in x 3 in)*	*single unit*
DP-5033-I	*7.5 cm x 7.5 cm (3 in x 3 in)*	*5 units/box*
DP-1045-I	*10 cm x 12.5 cm (4 in x 5 in)*	*single unit*
DP-1057-I	*12.5cm x 17.5 cm (5 in x 7 in)*	*single unit*

PRODUCT INFORMATION DISCLOSURE

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RETURNED GOODS POLICY

- Authorization, from customer service, must be obtained prior to returning product.
- Sterile product must be returned in unopened, undamaged cartons, packed to prevent damage.
- Non-sterile product must be returned in unused saleable condition in original package.
- Custom or special order products will not be accepted for credit.
- Credit will be issued for goods returned prior to ninety days from ship date with a restocking charge. This assumes that the product returned is not damaged and can be verified to have not been used or opened.

Symbols Used On Labeling

	Consult Instructions for Use
	Do not re-sterilize
	Do not use if package is damaged
	Expiration date
	Do not re-use
LOT	Lot number
STERILE EO	Sterilized using Ethylene Oxide
CE 0086	Product complies with requirements of directive 93/42/EEC.
REF	Catalog number
	Manufacturer
EC REP	Authorized Representative in the European Community
Rx ONLY	Caution: Federal (USA) law restricts this device to sale by or on the order of a physician or practitioner.


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