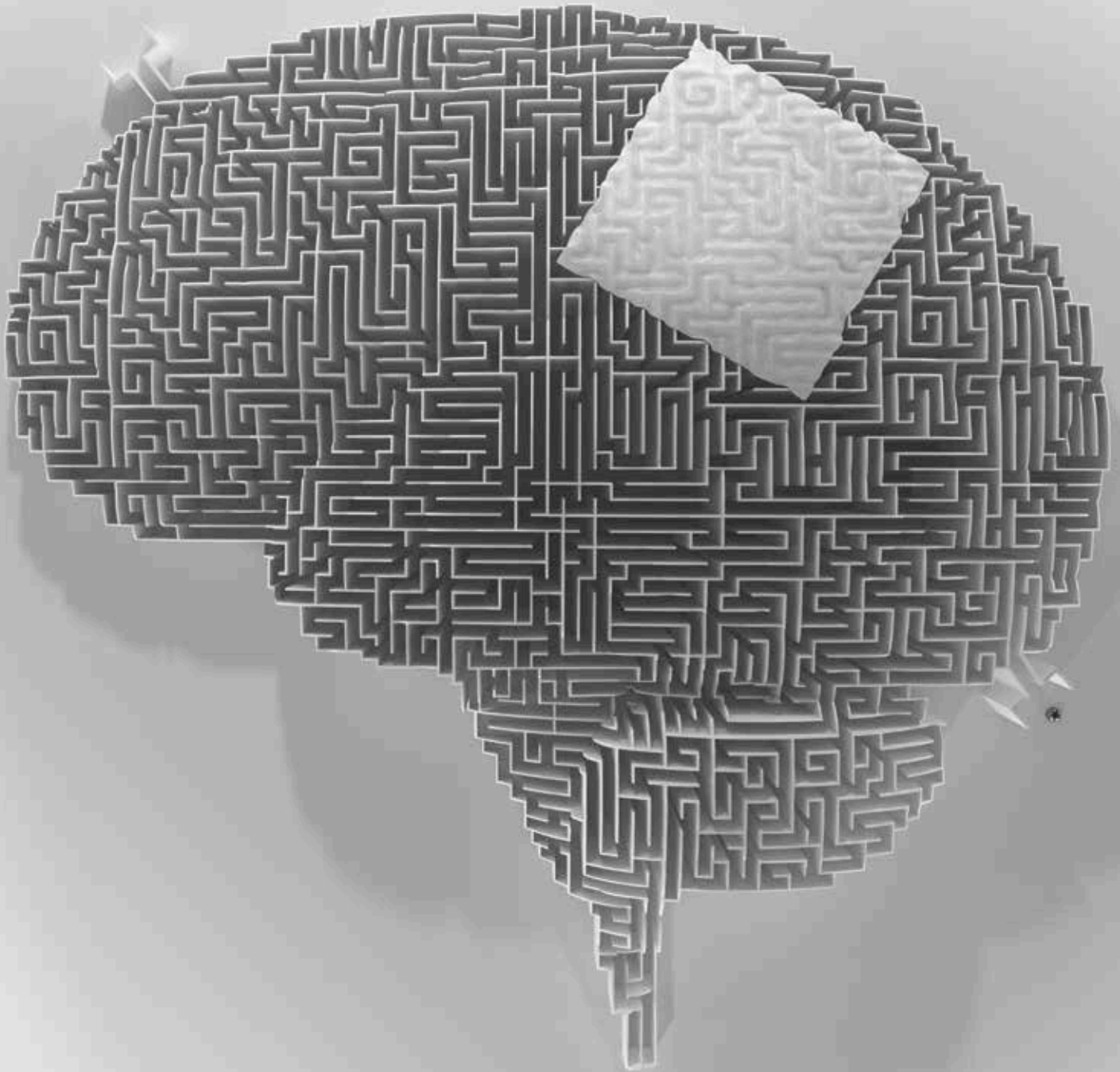


Neurosurgery is complex.
DuraGen® is the simple choice.



DuraGen® Family of Grafts

Dural Regeneration Matrix
Keep Closure Simple.

DuraGen® Family of Grafts

A Breakthrough in Dural Repair

A Pioneer in Dural Regeneration Matrices

For almost forty years, Integra and its predecessors have been leading the development and manufacturing of collagen implants and advanced regenerative technologies. In the early 1970's the first collagen matrix to improve skin restoration of severely burned patients was developed. This advanced matrix led to a revolution in understanding the science behind the biological response and role of extracellular matrices in tissue regeneration. This science along with expertise in collagen processing and manufacturing resulted in DuraGen® dural regeneration matrix.

- Integra pioneered regenerative medicine.
- Over 10 million collagen implants.
- Integra created the only dural graft paradigm.

What is DuraGen



DuraGen is the most studied and proven collagen-based dural graft for the repair of dura mater.

- DuraGen is made from a controlled collagen source and is treated with a proprietary process designed to remove antigenic components, yielding our **Ultra Pure Collagen™**.
- When hydrated, it is conformable and contours instantly and effectively to the complex surfaces of the underlying anatomy, allowing rapid formation of the fibrin clot to protect against CSF leakage.

DuraGen Family of Grafts

DuraGen®
PLUS

The only nature of DuraGen revolutionized duraplasty. The highly porous collagen scaffold promotes the fibrin clot process to prevent CSF leakage while promoting natural dural growth.

DuraGen®
SUTURABLE

DuraGen®
XS

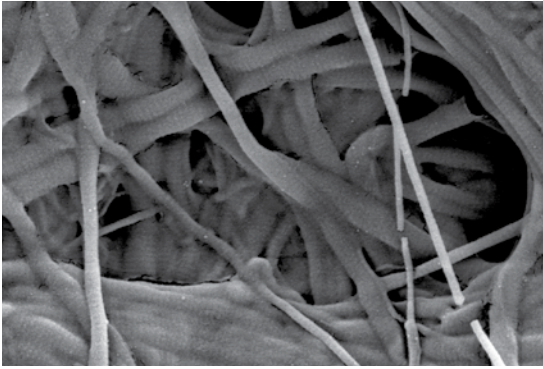
DuraGen®
SECURE

DuraGen®
CLASSIC

Conforms intimately
to complex surfaces



THE DURAGEN MATRICES HAVE BEEN ENGINEERED TO **BALANCE STRENGTH AND FLEXIBILITY** ENSURING **OPTIMAL HANDLING, ENHANCED CONTACT, AND RESORPTION**—LEAVING THE PATIENT WITH A **NATURAL DURAL REPAIR.**



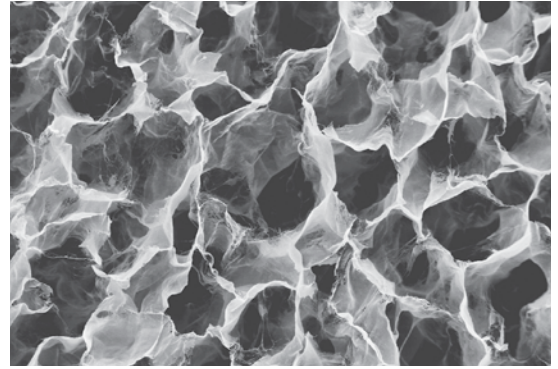
It Starts with Ultra Pure Collagen™

- Harvested, processed, and purified to limit the risk of infection, immunological response, and foreign body reaction, thereby reducing the chance of fibrotic encapsulation.
- In 30 years of Ultra Pure Collagen use, there have been no confirmed reports of foreign-body reactions or rejections.
- Integra's Ultra Pure Collagen is the foundation of DuraGen.



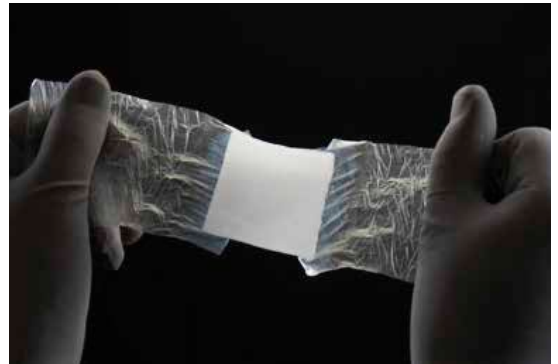
Excellent Conformability and Handling

- Offers optimal conformability and ease of handling.
- DuraGen is quickly and easily hydrated prior to implantation or in situ.
- Upon hydration, DuraGen becomes a pliable membrane that conforms to the existing dura and remains in place through surface tension and fibrin clot formation, eliminating the need for sutures.



Precisely Engineered Porosity

- Platelets infiltrate the matrix and initiate fibrin clot formation, forming an effective layer that prevents CSF leakage and initiates the dural repair process.
- The pore size is optimized to allow fibroblasts to rapidly enter the matrix and lay down natural collagen fibers.
- The optimized 99% porosity, even distribution, and pore interconnectivity promote uniform tissue regeneration throughout the matrix.

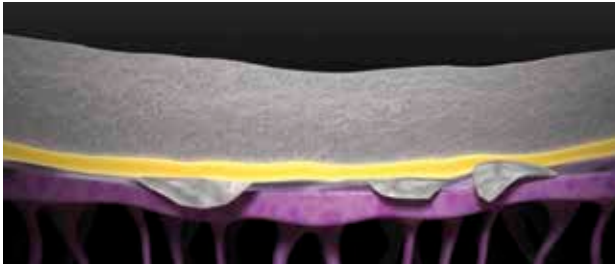


Enhanced Contact Assurance with DuraGen Secure

- Provides enhanced contact assurance for patients who may have undergone trauma, extended surgery, or have compromised dural margins due to age or other factors.
- DuraGen Secure unique fluid-activated cellulose microlayer helps to alleviate the concern about insecure contact.
- Secure contact supports the fibrin clot process leading to a watertight seal to prevent CSF leaks.

The Science of DuraGen

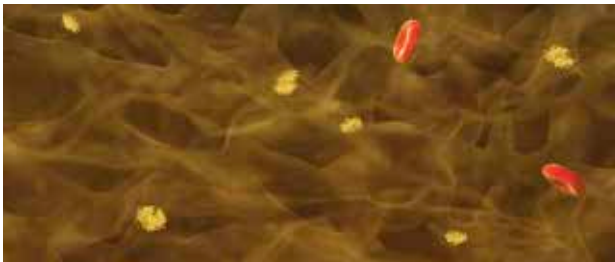
1 Secure Contact



- DuraGen Secure Matrix features a safe and natural cellulose derivative microlayer that keeps the graft in place 6x better than surface tension alone,¹ for secure contact in challenging situations.
- This unique microlayer is activated by fluid to create safe and temporary hydrostatic attraction between the graft and the dural margins.
- The microlayer is water soluble and dissolves within 24-72 hours after activation.

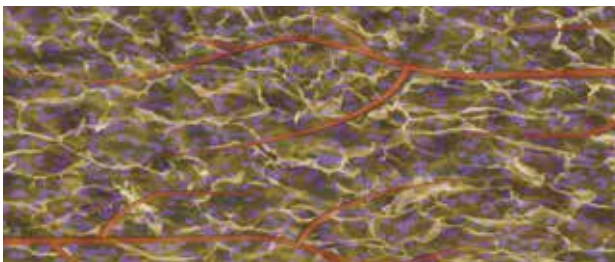
¹ Report #PDTR-114 Slip Testing for Collagen Onlay Products.

3 Rapid CSF Leak Prevention



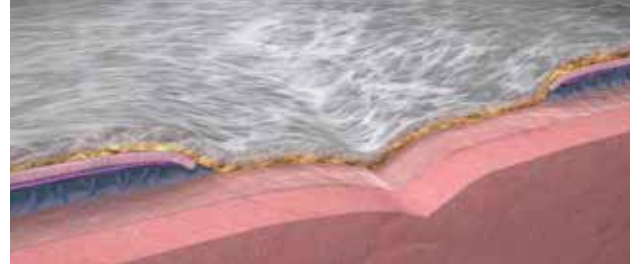
- Type 1 collagen matrix rapidly initiates platelet aggregation.
- Upon contact with the collagen matrix, platelets degranulate and release clotting factors that initiate fibrin clot formation.
- The fibrin clot creates a watertight barrier and binds the implanted matrix to the patient's dura.

5 Uniform Tissue Formation



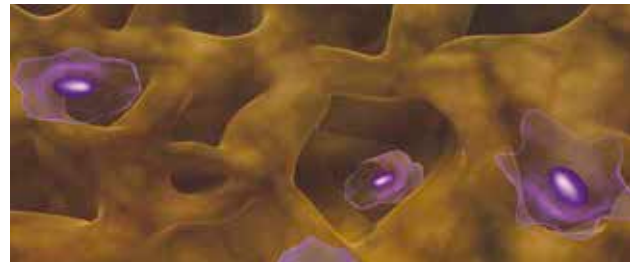
- Within two weeks of implantation, a neodural membrane has formed between the dural margins to permanently close the dural defect.
- After 6-8 weeks, the implant is resorbed and replaced by dura.
- After 1 year, the neodura has developed into mature dura.

2 Excellent Conformability and Adherence



- The hydrated graft conforms intimately to the complex surfaces of the exposed brain or spinal cord.
- Matrix rapidly fills with the patient's blood and plasma exudate.

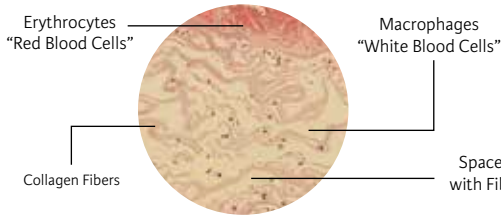
4 Rapid Fibroblast Infiltration



- Ultra Pure Collagen, in combination with the open pore structures, promotes fibroblast activity and acts as a scaffold for cells to deposit new collagen.
- The graft structure features pores of 50 to 150 microns, within the optimal size for rapid fibroblast infiltration.
- Fibroblasts begin to migrate into the matrix 2 to 3 days after implantation and start the process of laying down new collagen.

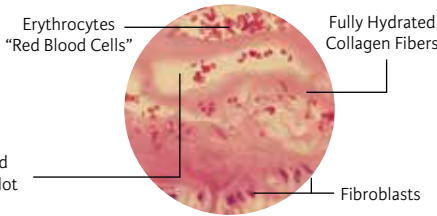
DuraGen® Family of Grafts

Superior Science



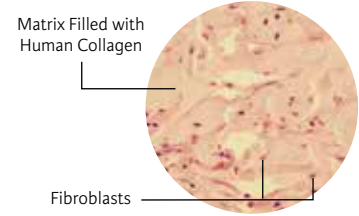
1 Day Post Implantation*

Fibrin clot formed within matrix creating watertight barrier



3 Days Post Implantation*

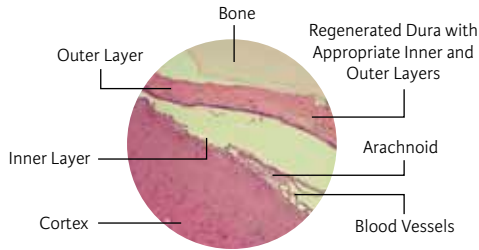
Fibroblasts infiltrate and attach to matrix to lay down new collagen



60 Days Post Implantation*

Fully regenerated dura

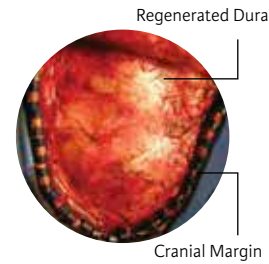
* P.Narotam, A. Gousseau, G. McGinn. Collagen Matrix (DuraGen) for duraplasty following cranial and spinal surgery. 35th Canadian Congress of Neurological Sciences, Ottawa, Canada, June 2000



60 Days Post Implantation - Porcine Study**

Collagen matrix resorbed and replaced with regenerated dura

** Porcine Durotomy Study, data on file



26 Weeks Post Implantation***

Dura as seen in secondary cranioplasty procedure 6-months after decompressive hemicraniectomy

*** Heuer G, Stiefel M, Maloney-Wilensky E, Danish S, Dolinskas C, LeRoux P. Duragen is Effective Dural Substitute: Clinical Experience with 100 cases. American Association of Neurological Surgeons Annual Meeting, April 2003

Limit uncertainty with the most advanced line of products for optimal dural repair:



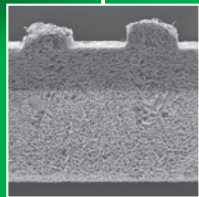
PLUS: *Reliability*

DuraGen Plus Matrix is clinically proven to limit CSF leakage, provide better handling, has an excellent safety record, and provides industry-leading conformability and resorption.



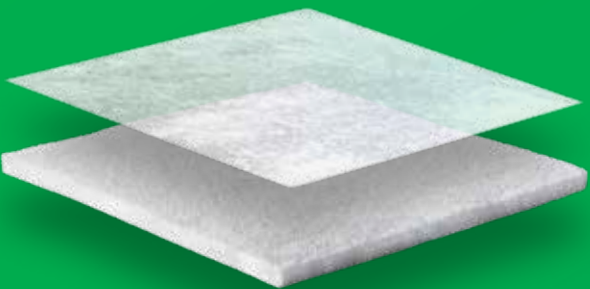
XS: *Performance*

DuraGen XS Matrix offers all of the positive attributes of DuraGen Plus matrix with an additional 30% more collagen. This additional collagen density provides increased tensile strength for optimized handling during challenging cases.



SUTURABLE: *Adaptability*

DuraGen Suturable Matrix provides the benefits of DuraGen Plus matrix with the added versatility of accommodating both suture and onlay techniques. DuraGen Suturable matrix is a bilayer collagen graft with enhanced strength and support, providing the ability to suture without losing the conformability and resorption you demand from a dural graft.



SECURE: *Confidence*

For the Neurosurgeon, patients with compromised dural margins present a unique challenge. DuraGen Secure Matrix offers all the benefits of the DuraGen family of products, with an added cellulose microlayer that provides enhanced contact assurance for patients with compromised dural margins. Secure offers six times greater slip resistance than traditional collagen onlay grafts, even under repeated irrigation or prolonged submersion, ensuring secure contact with the dural margins so that fibrin clot can begin and watertight closure can be achieved.

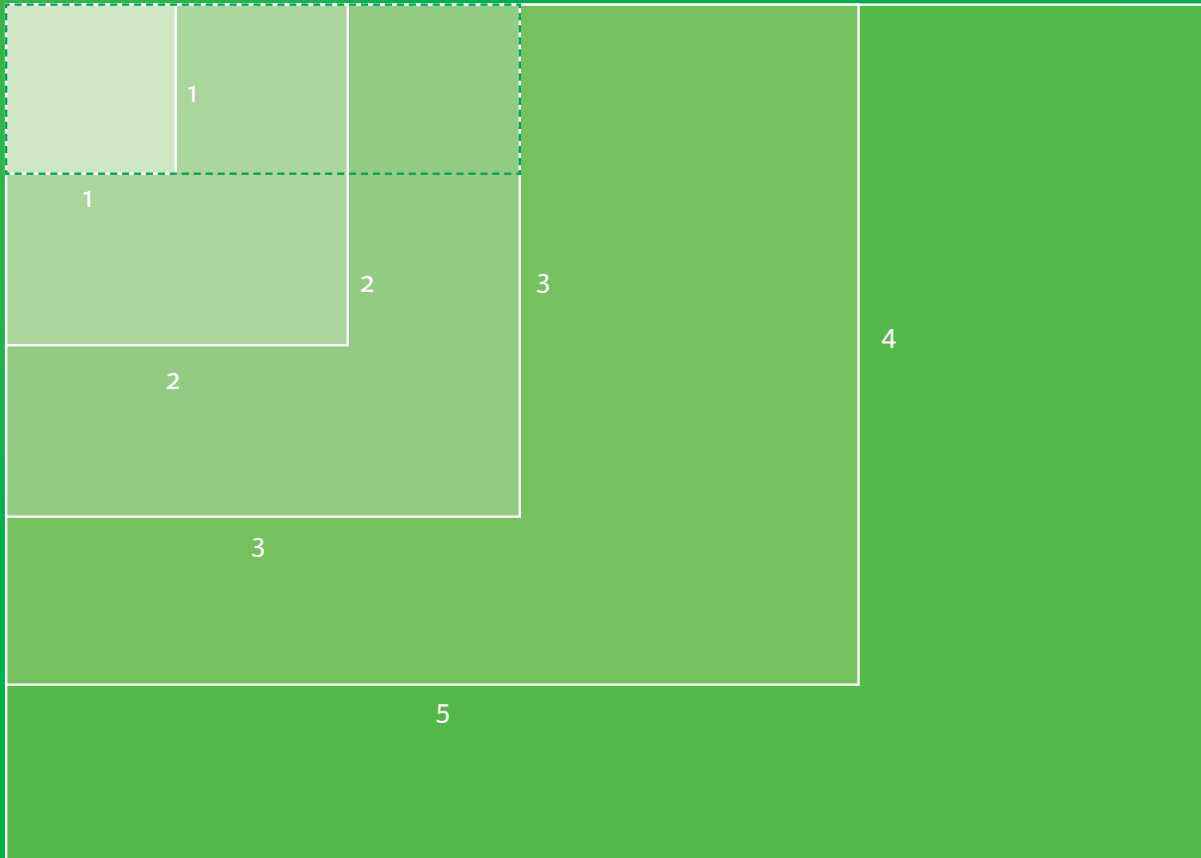


CLASSIC: *Conformability*

DuraGen matrix is one of the safest and most effective onlay grafts for the restoration and repair of dura mater. It is conformable and contours instantly and effectively to the complex surfaces of the brain and spinal cord, rapidly forming a biological seal to protect against CSF leakage.

DuraGen® Family of Grafts

Product Sizes to Meet Your Surgical Needs



7

Sizes shown in inches at actual size

DuraGen Plus Dural Regeneration Matrix

Catalog Number	Size	Units/Case
DP-1011	1 in x 1 in (2.5 cm x 2.5 cm)	1
DP-5011	1 in x 1 in (2.5 cm x 2.5 cm)	5
DP-1013	1 in x 3 in (2.5 cm x 7.5 cm)	1
DP-5013	1 in x 3 in (2.5 cm x 7.5 cm)	5
DP-1022	2 in x 2 in (5 cm x 5 cm)	1
DP-5022	2 in x 2 in (5 cm x 5 cm)	5
DP-1033	3 in x 3 in (7.5 cm x 7.5 cm)	1
DP-5033	3 in x 3 in (7.5 cm x 7.5 cm)	5
DP-1045	4 in x 5 in (10 cm x 12.5 cm)	1
DP-1057	5 in x 7 in (12.5 cm x 17.5 cm)	1

DuraGen Suturable Dural Regeneration Matrix

Catalog Number	Size	Units/Case
DURS-1391	1 in x 3 in (2.5 cm x 7.5 cm)	1
DURS-2291	2 in x 2 in (5 cm x 5 cm)	1
DURS-3391	3 in x 3 in (7.5 cm x 7.5 cm)	1
DURS-4591	4 in x 5 in (10 cm x 12.5 cm)	1

DuraGen XS Dural Regeneration Matrix

Catalog Number	Size	Units/Case
DXM-1013	1 in x 3 in (2.5 cm x 7.5 cm)	1
DXM-1022	2 in x 2 in (5 cm x 5 cm)	1
DXM-1033	3 in x 3 in (7.5 cm x 7.5 cm)	1
DXM-1045	4 in x 5 in (10 cm x 12.5 cm)	1
DXM-1057	5 in x 7 in (12.5 cm x 17.5 cm)	1

DuraGen Secure Dural Regeneration Matrix

Catalog Number	Size	Units/Case
DRM-1011	1 in x 1 in (2.5 cm x 2.5 cm)	1
DRM-1013	1 in x 3 in (2.5 cm x 7.5 cm)	1
DRM-1022	2 in x 2 in (5 cm x 5 cm)	1
DRM-1033	3 in x 3 in (7.5 cm x 7.5 cm)	1

DuraGen Dural Regeneration Matrix

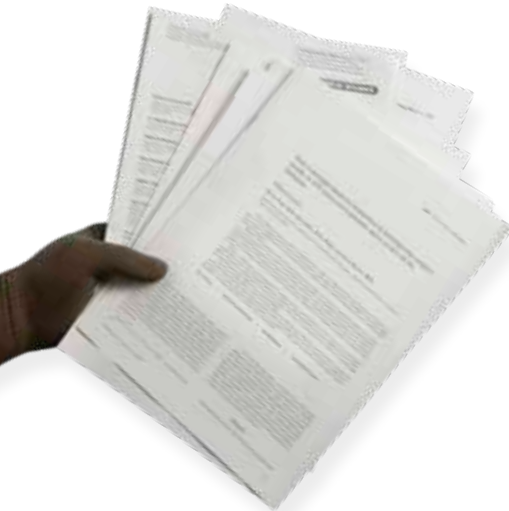
Catalog Number	Size	Units/Case
ID-1101	1 in x 1 in (2.5 cm x 2.5 cm)	1
ID-1105	1 in x 1 in (2.5 cm x 2.5 cm)	5
ID-1301	1 in x 3 in (2.5 cm x 7.5 cm)	1
ID-1305	1 in x 3 in (2.5 cm x 7.5 cm)	5
ID-2201	2 in x 2 in (5 cm x 5 cm)	1
ID-2205	2 in x 2 in (5 cm x 5 cm)	5
ID-3301	3 in x 3 in (7.5 cm x 7.5 cm)	1
ID-3305	3 in x 3 in (7.5 cm x 7.5 cm)	5
ID-4501	4 in x 5 in (10 cm x 12.5 cm)	1

DuraGen® Family of Grafts

Unsurpassed Clinical Data

Two Million Implants and Counting

Only Integra® DuraGen® grafts provide the confidence of utilizing a dural matrix which has been implanted over two million times.



Over 1,400 patients in 10 published clinical studies

- **0% Foreign body response**
- **1.9% Infection rate**
- **2.1% Leakage rate**

Integra's DuraGen products have more published human clinical data than any other collagen-based dural graft.

Clinical studies have shown effective protection against CSF leakage with sutureless closure and no reports of foreign body reactions or graft rejections.

Summary outcome statistics derived from the following 10 clinical studies:

1. Danish SF, et al: Experience with acellular human dura and bovine collagen matrix for duraplasty after posterior fossa decompression for Chiari malformations. *J Neurosurg Pediatrics* 104:16-20, 2006
2. Harvey RJ, et al: Closure of large skull base defects after endoscopic transnasal craniotomy. *J Neurosurg* 111: 271-329, 2009
3. Horaczek JA, et al: Collagen matrix in decompressive hemicraniectomy. *Operative Neurosurgery* 63: ONS176-81, 2008
4. Lee JH, et al: Dural reconstruction in meningioma surgery in, Lee JH (ed): *Meningiomas: Diagnosis, Treatment an Outcome*. London: Springer, 2009, pp 619-624
5. Litvack ZN, et al: Dural augmentation: Part I: evaluation of collagen matrix allografts for dural defect after craniotomy. *Neurosurgery* 65:890-897, 2009
6. Narotam PK, et al: Collagen matrix (DuraGen) in dural repair: analysis of a new modified technique. *SPINE* 292:861-2867, 2004
7. Narotam PK, et al: Collagen matrix duraplasty for cranial and spinal surgery: a clinical and imaging study. *J Neurosurg* 106:45-51, 2007
8. Narotam PK, et al: Collagen matrix duraplasty for posterior fossa surgery: evaluation of surgical technique in 52 adult patients. *J Neurosurg* 111:380-386, 2009
9. Sade B, et al: Non-watertight dural reconstruction in meningioma surgery: results in 439 consecutive patients and a review of the literature. Clinical article. *J Neurosurg* [epub ahead of print August 13, 2010. DOI: 10.3171/2010.7.JNS10460]
10. Stendel R, et al: Efficacy and safety of a collagen matrix for cranial and spinal dural reconstruction using different fixation techniques. *J Neurosurg* 109:215-221, 2008

DuraGen Regenerative Matrix

- **Made from Ultra Pure Collagen™**
- **Precisely engineered porosity for complete and natural repair**
- **Excellent conformability**
- **Enhanced contact assurance with DuraGen Secure**

For more information or to place an order, please contact:

Integra ▪ 311 Enterprise Drive, Plainsboro, NJ 08536

800-997-4868 USA ▪ 609-936-5400 outside USA ▪ 888-980-7742 fax

integralife.com

