powerbone®

pioneer of health

- Orthopaedics
- Trauma
- Spine
- Sports Medicine
- Dental

Regenerative Solutions
Synthetic Biomaterials

Granule
Stick - Block
Flexible Strip
Putty - Gel
Dental Putty
Barrier Membrane
Chondro Matrix
Bone Cement

BONEGRAFT®
BIOMATERIALS


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BONEGRAFT Co.

Bonegraft is a biotechnology based company that is focusing on research and development on biomaterials such as bone and cartilage tissue scaffolds and polymeric membranes in the modern laboratory of ISO Class 7 (Class 10.000) clean rooms in Ege University Technology Development Center.

Powerbone products are indicated for use as a bone graft substitute for the support of bone tissue formation at non-load bearing osseous defects created surgically or through traumatic injury. Powerbone products may be combined with autogenous blood and/or bone marrow as well as with other bone grafts.

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General Features of Bone Substitutes

• 100% Synthetic
Contains no tissue of human or animal origin therefore carries no risk of disease transmission.

• Osteoconductive
Act as a scaffold and support bone tissue regeneration. Similar to to the mineral found in bone tissue.

• Bioresorbable
With its optimized porous structure and chemical compositon, Powerbone is suitable for the continuous remodeling cycle of healty bone. ß-TCP resorbs over time and be replaced with bone during the healing process.

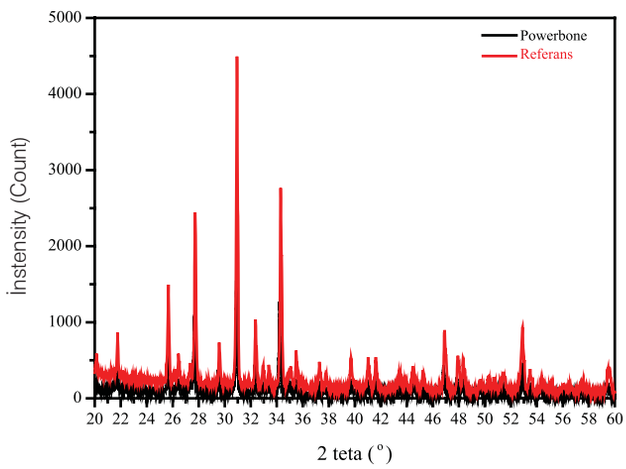
• Safe
Powerbone is supplied sterile and CE marked as a Class III Medical Device according to Directive 93/42/EEC.

• Biocompatible and Sterile
Powerbone is tested using: Pre-clinical studies, Biocompatibility tests (in vitro and in vivo), Biomechanical tests, Biodegradation tests, Bioburden and Sterility tests.

• Radiopaque
Could be detected via CT and X-ray.

• Antibacterial

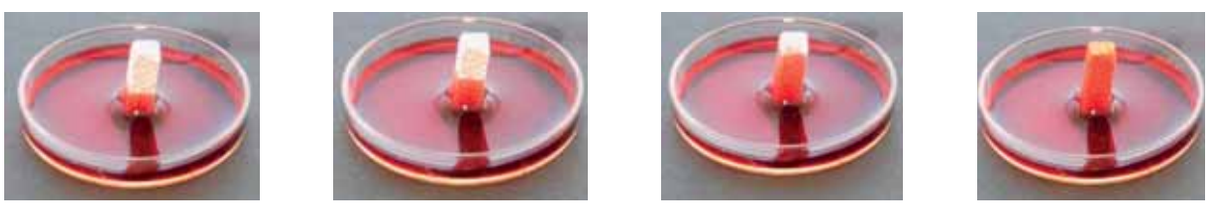
• Versatile
Available in granules, sticks, blocks, edges, putty and gel form at different sizes for different indications.



XRD Graphic of β-TCP Powder

The maximum peak 28 values of the phases are defined by matching with the JCPDS (Joint Committee on Powder Diffraction Standards) database. When examining the XRD data of the Powerbone branded product, the maximum peak grades were found to be compatible with whitlockit with JCPDS 090169 card number 27,77 (214), 31,03 (2010), 34,37 (220) respectively. Since ß-TCP and whitlockit have similar XRD profiles, [1,2] data are compared with a commercial product obtained from 100% crystallin ß-TCP, based on ≥ 98% beta phase according to manufacturer's description. Besides, XRD profile of Powerbone ß-TCP were compared with a well-known commercial product which has ≥98%

(1) Gopal R, Calvo C (1972) Structural Relationship of Whitlockite βCa3(P04)2. Nat Phys Sci 237: 30-32
(2) Frondel C. (1943) Mineralogy of the calcium phosphates insular phosphate rock. Am Mineral 28: 215-23.



Incubating Powerbone Stick in red ink solution. Images captured in every 5 seconds. After 20 seconds sticks are completely covered.

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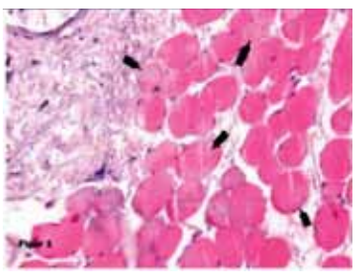
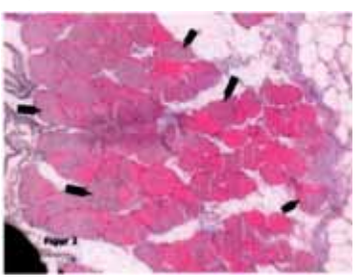
Powerbone Granules, Stick & Block & Wedge

The interconnectivity of porous structure and microporosity assist capillary motion of blood and body fluids, enhanced penetration for osteogenic cells, and ossification of the synthetic matrix. For Macroporosity, Powerbone Granules and Stick & Block allows deep invasion of bone cells into the matrix. Powerbone polygonal granules have different particle size between 0,25-7 mm.
The irregularly shaped granules promote interlocking and improve mechanical stability.

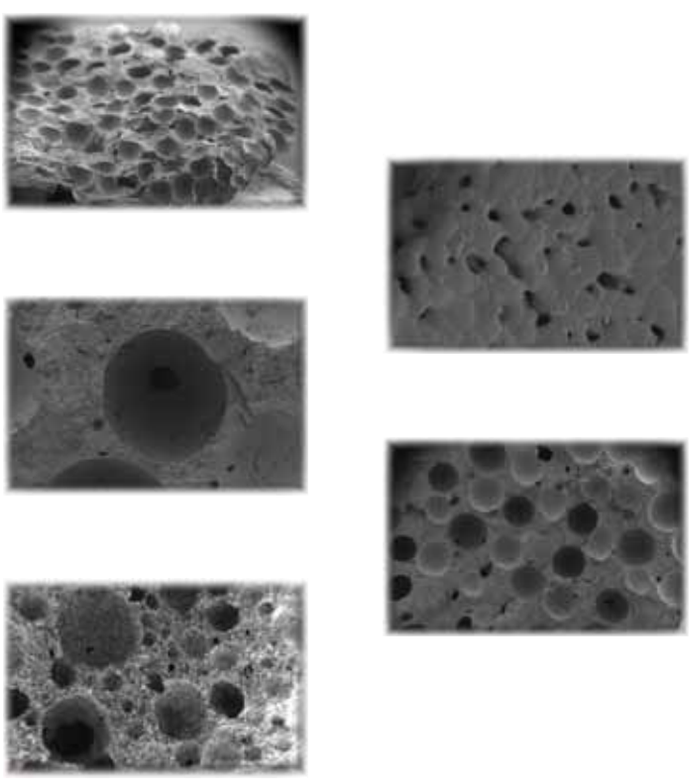


Osteoid formation (Osteoinductive characteristics) 2 months after impantation of Powerbone Granule (Crunch) in skelatal muscle



Micro CT analysis of Granules

When the images are examined, it is observed Powerbone grafts has as interconnective porous structure and this structure is spread throughout the sample. Also micro and macro pores are determined in the structure of Powerbone granules and sticks. Given cell attachment and development, the presence of interconnective pores in contact with each other promotes cell attachment and development [1-3].



SEM analysis of Granules

(1) BMP-induced osteogenesis on the surface of hydroxyapatite with geometrically feasible and nonfeasible structures: topology of osteogenesis J Biomed Mater Res, 39 (2) (1998), pp. 190-199.

(2) S.F. Hulbert, F.A. Young, R.S. Mathews, J.J. Klawitte, C.D. Talbert, F.H. Stelling potential of ceramic materials as permanently implantable skeletal prostheses J Biomed Mater Res, 4(3) 1970, pp. 433-456

(3)A.I. Itala, H.O. Ylanen, C. Ekholm, K.H. Karlsson, H.T. Aro Pore diameter of more than 100 micron isno requisite for bone ingrowth in rabbits J Biomed Mater Res, 58 (6) (2001), pp. 679-683.

Powerbone Flexible Strip

Powerbone Flexible Strip is a bioresorbable synthetic bone graft that provides great handling with high elasticity for specific cases including bone defects in the pelvis, extremities, and the posterolateral spine fusion.

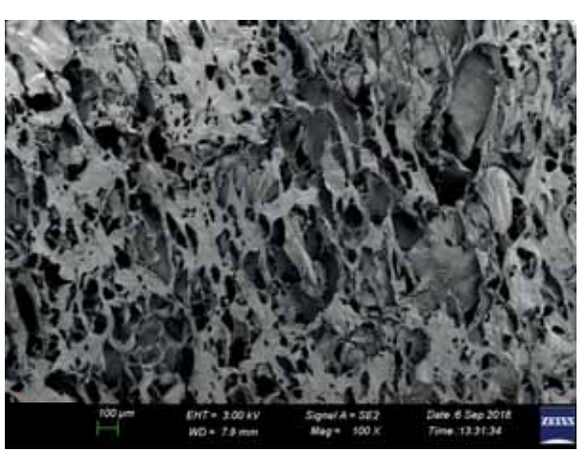
Powerbone Flexible Strip is composed of silicate additive β-TCP and PLA based synthetic polymer.

Powerbone Flexible Strip

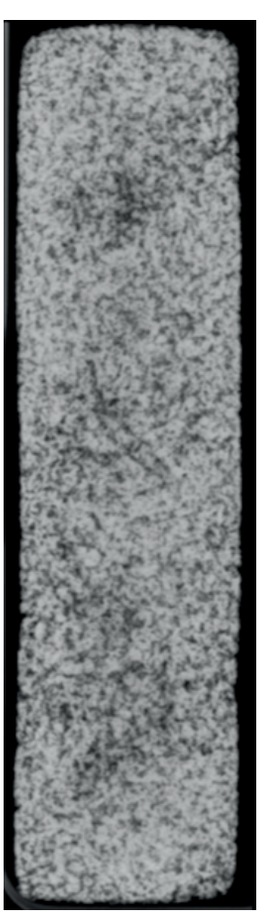
Elasticity of Powerbone Flexible Strip

Instructions of Implanting Powerbone Flexible Strip:

- Powerbone Flexible Strip can be applied directly or combination with bone marrow aspirate/blood to the surgical site.
- Wetting Powerbone Flexible Strip increases flexibility.
- Place Powerbone Flexible Strip into the surgical site just before the closure of the surgical area once all metallic implants are stable.
- Powerbone Flexible Strip can be cut to fit into a cage.



SEM Görüntüsü

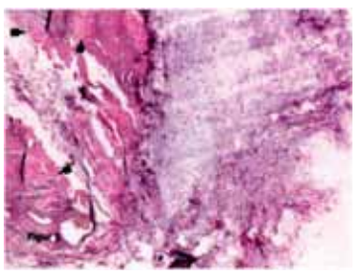


Micro-CT analysis of
Powerbone Flexible Strip

Powerbone Putty, Gel, and Dental Putty

Reasons to select Powerbone Dental Putty;

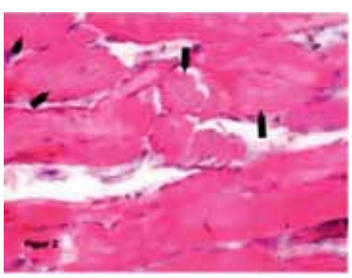
- Minimal invasive surgical protocol
- Easier and faster application
- Ready to use
- No mixing required
- Enhance bone regeneration
- No membrane usage (for dental putty only)
- Reduce chair time



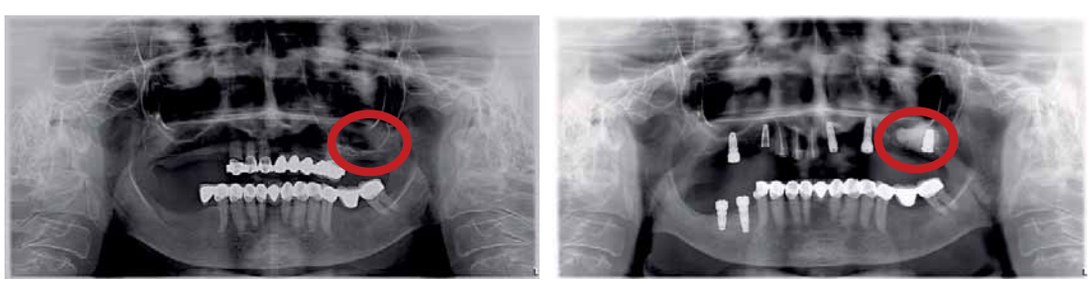
Osteoid formation (Osteoinductive characteristics) 2 months after impantation of Powerbone Putty in skelatal muscle

General procedure of Powerbone Dental Putty in sinüs lifting, lateral augmentation, and socket grafting;

1. Lift a flap
   - The flap should be minimally reflected to open up whole graft site.
   - Prepare the defect site for grafting
2. Dental Putty application
   Inject the dental putty and press gently for 5 seconds to get the defect shape by using sterile dry gauze.



Use of Powerbone Putty in sinus lifting operation.



A- Before grafting procedure

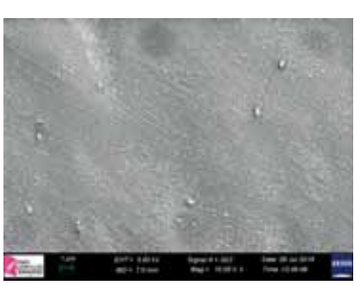
B- 5 months after grafting procedure

The sinus defect filled with Powerbone Putty heals completely after 5 months. Radiological view of before and after grafting application. As it is seen, bone tissue completely regenerated and dental implant was successfully placed.

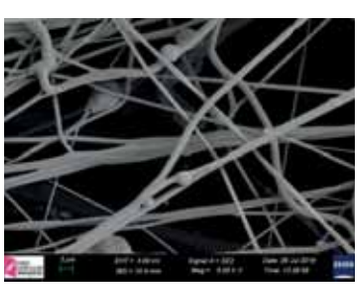
Powerbone Dental Barrier Membrane

- Specifically engineered for periodontal restorative surgeries and assists in the regeneration of bone and periodontal support tissues.
- Fabricated from a biocompatible and bioresorbable medical grade poly(lactic acid) based synthetic polymer with a long history of safe medical use.
- The Powerbone Barrier Membrane maintains its architecture and completely resorbed 15-20 weeks after implantation.
- Advantages of Powerbone Dental Barrier Membrane;
• Prevents fibrous tissue growth in bone zone
• No risks of virus or disease transmission
• No requirement for removing membranes due to complete bioresorbtion

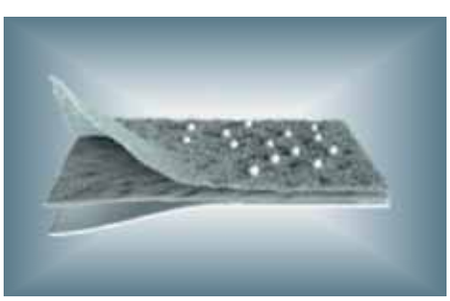
Application of Powerbone Dental Barrier Membrane.



Exteriur side of Powerbone Dental Barrier Membrane compose of non-porous poly(lactic acid) (PLA) based film to prevent epitherliel cells and fibroblast migratio



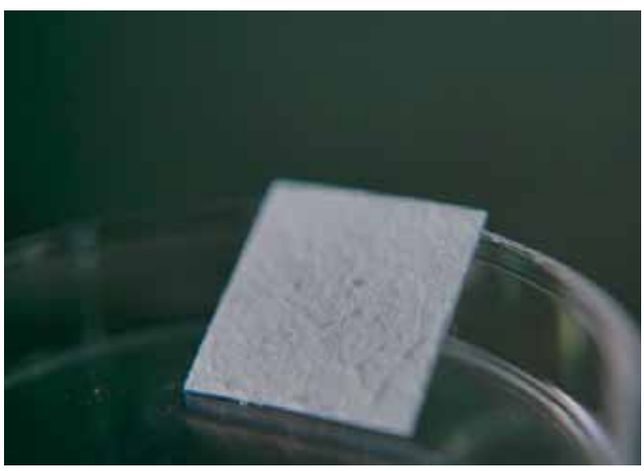
Interiour side of Powerbone Dental Barrier Membrane compose of porous poly(lactic acid) (PLA) based microfibers to enhance mesenchmal stem cells adhesion, proliferation and differentiation.



Three-layer construction of Powerbone Dental Barrier Membrane

Powerbone Chondro Matrix

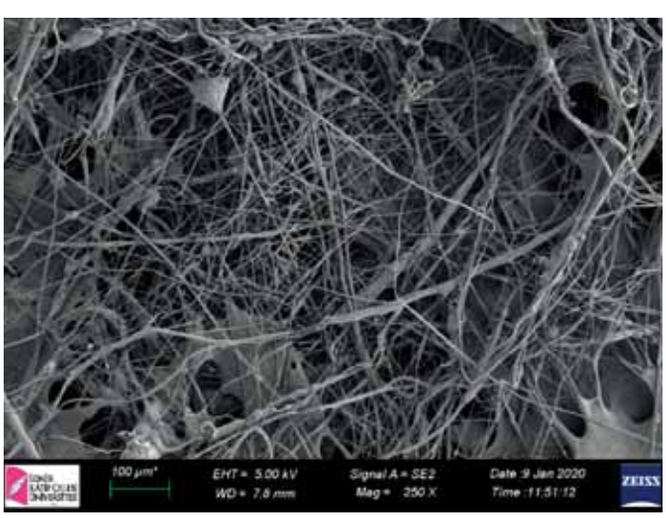
Powerbone Chondro Matrix is a high-tech scaffold with a flexible and hydrophilic structure, treated with Sodium hyaluronate, sterile, absorbable matrix sponge-like nonwoven Polyglycolic acid (PGA).



Powerbone Chondro Matrix

Hyaluronic Acid Based Powerbone Cartilage Repair Matrix;

- Contains hyaluronic acid, which effectively supports cartilage formation,
- Based on PGA and hyaluronic acid and does not contain collagen and animal tissue,
- Suitable for the regeneration cycle of healthy cartilage,
- Bioresorbable and support cartilage formation during the healing process,
- No fragmentation or disintegration during cutting.
- Interconnective porous structure enables the movement of blood and body fluids to increase penetration for cells.



SEM Images of Hyaluronic Acid Based Powerbone Cartilage Repair Matrix

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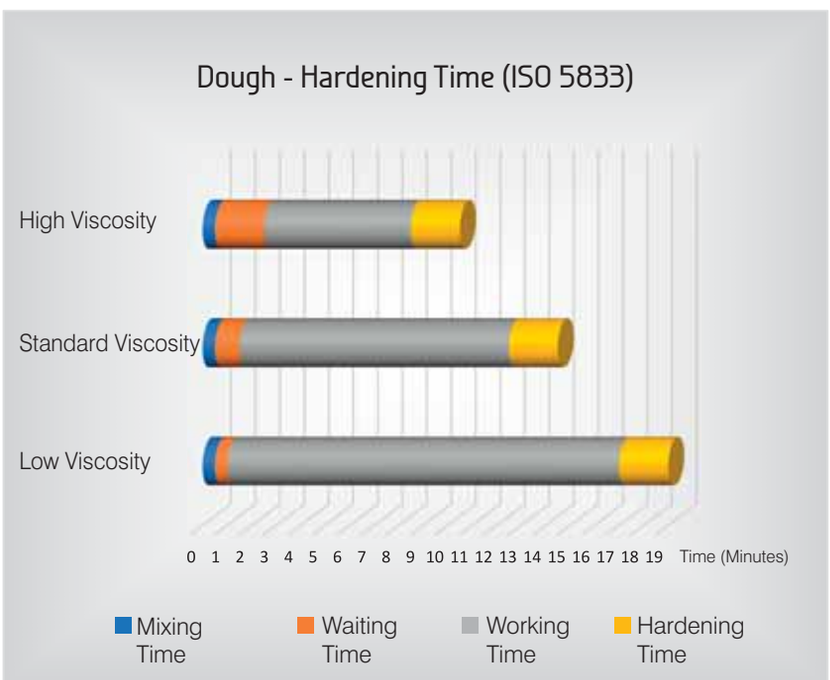
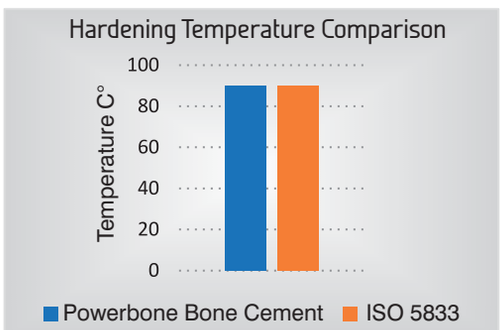
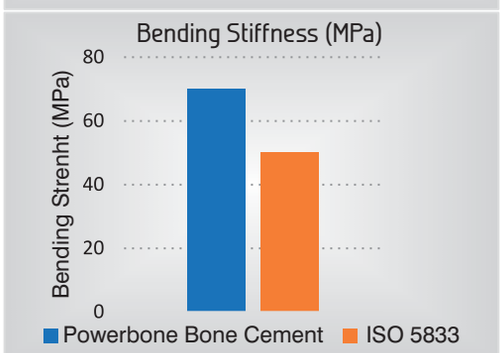
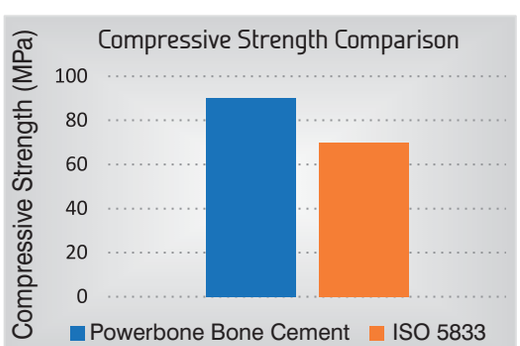
Bone Cement (for Spine&Ortho)

Bone Cement based on polymethyl methacrylate (PMMA) is a widely used biomaterial due to its ease of use in clinical practice and especially the long survival rate proven by dentures.









- Common Indications for Bone Cement: total joint replacement are bone and joint reconstructions, fracture fixation and treatment of osteoporotic vertebral fractures.
- Bone Cement consists of two phases, solid and liquid phase.
- To use the product, two phases are mixed in the mixing bowl for 30 seconds.
- Since the product is offered in three different viscosities, low, standard and high, it can be used in different surgical applications at Spine&Ortho.
- Products have paste, hardening, maximum temperature and mechanical strength values specified in ISO 5833 standard.

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PRODUCT NAME	REFERENCE CODE	MEASURE	VOLUME
Powerbone Granule			
	PG02501005	0.25-1 mm	0,5 cc
	PG02501010	0.25-1 mm	1 cc
	PG02501020	0.25-1 mm	2 cc
	PG05001005	0.5-1 mm	0,5 cc
	PG05001010	0.5-1 mm	1 cc
	PG05001020	0.5-1 mm	2 cc
	PG05001050	0.5-1 mm	5 cc
	PG05001075	0.5-1 mm	7,5 cc
	PG05001100	0.5-1 mm	10 cc
	PG10002005	1-2 mm	0,5 cc
	PG10002010	1-2 mm	1 cc
	PG10002020	1-2 mm	2 cc
	PG10002050	1-2 mm	5 cc
	PG10002075	1-2 mm	7,5 cc
	PG10002100	1-2 mm	10 cc
	PG10002150	1-2 mm	15 cc
	PG10002200	1-2 mm	20 cc
	PG10002300	1-2 mm	30 cc
	PG020405	2-4 mm	5 cc
	PG0204075	2-4 mm	7,50 cc
	PG020410	2-4 mm	10 cc
	PG020415	2-4 mm	15 cc
	PG020420	2-4 mm	20 cc
	PG020430	2-4 mm	30 cc
	PG030505	3-5 mm	5 cc
	PG030510	3-5 mm	10 cc
	PG030515	3-5 mm	15 cc
	PG030520	3-5 mm	20 cc
	PG030530	3-5 mm	30 cc
	PG040705	4-7 mm	5 cc
	PG0407075	4-7 mm	7,50 cc
	PG040710	4-7 mm	10 cc
	PG040715	4-7 mm	15 cc
	PG040720	4-7 mm	20 cc
	PG040730	4-7 mm	30 cc
	PG070905	7-9 mm	5 cc
	PG0709075	7-9 mm	7,5 cc
	PG070910	7-9 mm	10 cc
	PG070915	7-9 mm	15 cc
	PG070920	7-9 mm	20 cc
	PG070930	7-9 mm	30 cc

Note: For different size requests, please contact (info@bonegraft.com.tr)

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PRODUCT NAME	REFERENCE CODE	MEASURE	VOLUME
Powerbone Stick & Block & Wedge			
	PS44201	4x4x20mm (1 pc)	2,03 cc
	PS44202	4x4x20mm (2 pcs)	4,05 cc
	PS44204	4x4x20mm (4 pcs)	8,10 cc
	PS44205	4x4x20mm (5 pcs)	10,13 cc
	PS44206	4x4x20mm (6 pcs)	12,15 cc
	PS55204	5x5x20mm (4 pcs)	16,50 cc
	PS55205	5x5x20mm (5 pcs)	20,63 cc
	PS55206	5x5x20mm (6 pcs)	24,76 cc
	PS5510	5x5x10mm	2,06 cc
	PS5520	5x5x20mm	4,13 cc
	PS5617	5x6x17mm	4,21 cc
	PS5634	5x6x34mm	8,42 cc
	PS6717	6x7x17mm	5,89 cc
	PS6734	6x7x34mm	11,78 cc
	PS8820	8x8x20mm	10,56 cc
	PS101020	10x10x20mm	16,50 cc
	PS151520	15x15x20mm	24,50 cc
	PS71214	7x12x14mm	9,69 cc
	PS71216	7x12x16mm	11,07 cc
	PS81214	8x12x14mm	11,07 cc
	PS81216	8x12x16mm	12,66 cc
	PS91214	9x12x14mm	14,24 cc
	PS91216	9x12x16mm	16,27 cc
	PS101040	10x10x40mm	9,95 cc
	PS101147	10x11x47mm	10,00 cc
	PS111947	11x19x47mm	20,00 cc
	PS1010402	10x10x40mm (2 pcs)	19,90 cc
	PSC5204	5x20mm	12,96 cc
	PSC6204	6x20mm	15,56 cc
	PSC8204	8x20mm	20,76 cc
	PW062530	6x25x30mm	5,15 cc
	PW082530	8x25x30mm	7,65 cc
	PW102530	10x25x30mm	10,15 cc
	PW122530	12x25x30mm	15,15 cc
	PW142530	14x25x30mm	20,15 cc
	PW061520	6x15x20mm	2,06 cc
	PW081520	8x15x20mm	2,75 cc
	PW101520	10x15x20mm	3,44 cc
	PW121520	12x15x20mm	4,13 cc
	PW141520	14x15x20mm	4,82 cc

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PRODUCT NAME	REFERENCE CODE	MEASURE	VOLUME
Powerbone Flexible Graft			
	PFS25254	25x25x4 mm	2,50 cc
	PFS25504	25x50x4 mm	5,00 cc
	PFS25505	25x50x5 mm	6,25 cc
	PFS25506	25x50x6 mm	7,50 cc
	PFS25508	25x50x8 mm	10,00 cc
	PFS50504	50x50x4 mm	10,00 cc
	PFS50506	50x50x6 mm	15,00 cc
	PFS60504	60x50x4 mm	12,00 cc
	PFS60505	60x50x5 mm	15,00 cc
	PFS60606	60x60x6 mm	21,60 cc
	PFS35605	35x60x5 mm	10,50 cc
	PFS35606	35x60x6 mm	12,60 cc
	PFS75405	75x40x5 mm	15,00 cc
	PFS30306	30x30x6 mm	5,40 cc

PRODUCT NAME	REFERENCE CODE	VOLUME
Powerbone Putty		
	PP005	0,5 cc
	PP0055	0,55 cc
	PP006	0,6 cc
	PP01	1 cc
	PP02	2 cc
	PP03	3 cc
	PP05	5 cc
	PP06	6 cc
	PP075	7,5 cc
	PP10	10 cc

PRODUCT NAME	REFERENCE CODE	VOLUME
Powerbone Gel		
	PG01	1 cc
	PG02	2 cc
	PG03	3 cc
	PG05	5 cc
	PG06	6 cc
	PG10	10 cc

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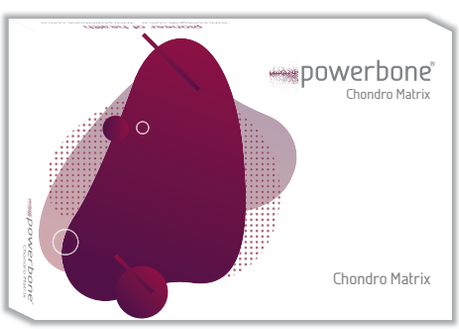
PRODUCT NAME	REFERENCE CODE	VOLUME
Powerbone Dental Putty		
	PDP030	0,3 cc
	PDP050	0,5 cc
	PDP060	0,6 cc
	PDP075	0,75 cc
	PDP100	1 cc

PRODUCT NAME	REFERENCE CODE	DIMENSIONS
Powerbone Barrier Membrane		
	PM1520	15x20 mm
	PM1525	15x25 mm
	PM2020	20x20 mm
	PM2025	20x25 mm
	PM2030	20x30 mm
	PM2530	25x30 mm
	PM3040	30x40 mm
	PM1520-5	15x20 mm (5 pcs)
	PM1525-5	15x25 mm (5 pcs)
	PM2020-5	20x20 mm (5 pcs)
	PM2030-5	20x30 mm (5 pcs)

PRODUCT NAME	REFERENCE CODE	DIMENSIONS
Powerbone Chondro Matrix		
	PK202011	20-20-1,1 mm
	PK203011	20-30-1,1 mm
	PK251711	25-17-1,1 mm
	PK252511	25-25-1,1 mm
	PK253511	25-35-1,1 mm
	PK353511	35-35-1,1 mm

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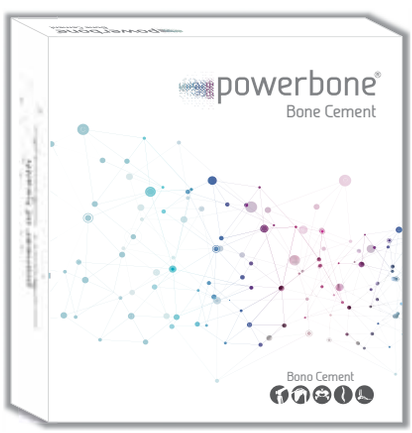
Powerbone Bone Cement



PRODUCT NAME	REFERENCE CODE	WEIGHT
Powerbone LV Vertebroplasty, 20g	PVC-LV-20	20g
Powerbone LV Vertebroplasty, 40g	PVC-LV-40	40g
Powerbone SV Vertebroplasty, 40g	PVC-SV	40g
Powerbone LV Kyphoplasty, 20g	PKC-LV-20	20g
Powerbone LV Kyphoplasty, 40g	PKC-LV-40	40g
Powerbone SV Kyphoplasty, 40g	PKC-SV	40g
Powerbone SV Standard - Normal, 40g	POC-SV40	40g
Powerbone HV, 40g	S-PC-HV	40g

Note: For different size requests, please contact (info@bonegraft.com.tr)

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BONEGRAFT BİYOLOJİK MALZEMELER SAN. VE TİC. A.Ş.

Ege Üniversitesi Sit. İdeege Teknoloji Geliştirme Bölgesi A.Ş.
Erzene Mahallesi Ankara Caddesi No:172/67
Bornova / İZMİR - TÜRKİYE - P.C.35100

Keçiliköy OSB Mahallesi İsmail Kahraman Caddesi No:1/1/A
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