Would you like to customize the DBM Carrier according to your Patient’s need?

Featuring

Bone Morphogenetic Proteins with the option of adding Patient’s own Stem Cells and Growth Factors
• 100% DBM
• Freeze dried
• Unique vacuum system takes in exact amount of fluid needed to hydrate graft
• Allows the surgeon to customize carrier to fit patient’s specific needs by the following hydration options
  ◇ Platelet concentrate (GPS® and Vortech™ Systems)
  ◇ Plasma concentrate (Vortech™ and Plasmax™ Systems)
  ◇ Bone marrow aspirate (Biomet Osteoprogenitor System)
  ◇ Whole blood
  ◇ Saline
  ◇ Antibiotic solution
• Allows surgeons to customize handling
  ◇ Product can be made into the consistency of a putty, gel or crunch-style graft
    (see handling characteristics)
**Introduction**

DBM is the perfect balance between autograft and allograft. It promotes bone growth by providing osteoinductive growth factors and an osteoconductive scaffold, while avoiding pitfalls such as autograft donor site morbidity and lack of allograft induction capabilities.¹ Bonus™ DBM offers all the benefits of DBM while providing doctors ultimate flexibility. Bonus™ DBM can be customized for each patient by hydrating with platelet concentrate, plasma concentrate, bone marrow aspirate, whole blood, saline or antibiotic.

**Bonus™ DBM**

- **(with PRP)**

**Bonus™ DBM**

- **(with Stem Cells)**

**Traditional DBM**

### Hydration Options

- **Platelet Concentrate (GPS® and Vortech™ Systems):** Platelets recruit and enhance the environment for soft tissue healing and bone growth
- **Plasma Concentrate (Plasmax™ and Vortech™ Systems):** Excellent hemostatic agent
- **Bone Marrow Aspirate (BOS™ needle):** Bone marrow contains progenitor cells, which can differentiate into muscle, fat, cartilage bone, etc.
- **Autologous Blood:** This safe autologous carrier improves handling
- **Saline:** Safe carrier improves handling
- **Antibiotic:** Prophylactic carrier for at-risk patients

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**Patient-specific demands require options**

Surgery is not an assembly line. Each patient has specific needs. Bonus™ DBM is the only DBM product capable of being customized for each patient via hydrating options for the surgeon.

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¹ This study supports the use of DBM in promoting bone growth.
**Bonus™ DBM Advantages**

<table>
<thead>
<tr>
<th>Matrix</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional DBM</td>
<td>Provides an osteoconductive scaffold to promote bone formation</td>
</tr>
<tr>
<td>Bonus™ DBM</td>
<td>Its porous scaffold allows full infiltration of stem cells and platelets</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional DBM</td>
<td>Provides osteoinductive, proliferative and chemoattractive signals, including BMP-2, BMP-4, BMP-7 TGF, PDGF, IGF-1 and FGF-1</td>
</tr>
<tr>
<td>Bonus™ DBM with GPS® Platelet Concentrate</td>
<td>Platelet concentrate further enhances these signals by the inclusion of PDGF, TGF, EGF and VEGF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cells</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional DBM</td>
<td>Encourages cell migration and differentiation from surrounding tissues</td>
</tr>
<tr>
<td>Bonus™ DBM with GPS® Platelet Concentrate</td>
<td>This cellular migration is greatly increased by the growth factors present in the platelet concentrate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nutrition</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional DBM</td>
<td>Depends on the local blood clot to provide growth factors</td>
</tr>
<tr>
<td>Bonus™ DBM with GPS® Platelet Concentrate</td>
<td>Platelet concentrate with its abundance of angiogenic factors, PDGF and VEGF, enhances the vascularization process, thereby providing nutritional support to new tissues</td>
</tr>
</tbody>
</table>

**DBM: Handling Characteristics**

<table>
<thead>
<tr>
<th>Liquid to Bonus Ratio</th>
<th>Application</th>
<th>Delivery</th>
<th>Handling Consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 ml: 10 ml 5 ml: 5 ml or 1 ml: 1 ml</td>
<td>Percutaneous injections, Contained defects</td>
<td>Fine bead nozzle, BOS™ needle</td>
<td>Flowable gel</td>
</tr>
<tr>
<td>6 ml: 10 ml 3 ml: 5 ml or .6 ml: 1 ml</td>
<td>Standard packing, Molding</td>
<td>Fine bead nozzle, Log</td>
<td>Putty</td>
</tr>
<tr>
<td>4 ml: 10 ml 2 ml: 5 ml or .4 ml: 1 ml</td>
<td>Very bloody environments with heavy irrigation</td>
<td>Log only</td>
<td>Crunchy</td>
</tr>
</tbody>
</table>

The unique vacuum system enables Bonus™ DBM to be handled as a putty, gel, or a very firm graft.

**Ordering Information**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>48-DBM1</td>
<td>5 ml Bonus™ DBM</td>
</tr>
<tr>
<td>48-DBM2</td>
<td>10 ml Bonus™ DBM</td>
</tr>
<tr>
<td>48-DBM4</td>
<td>1 ml Bonus™ DBM</td>
</tr>
</tbody>
</table>
Value of Growth Factors

Growth factors are critical in the bone healing process. Naturally, their release is initiated by the rush of platelets and white blood cells to the bone defect. Their functions include recruiting osteoprogenitor stem cells and osteoblasts, providing nutrition, and causing bone to mature more rapidly and increase its density.\(^2\)\(^-\)\(^5\)

These valuable growth factors, present in platelet concentrate, are released at the time frames displayed below.

**Initial Degranulation (t=0 hours)**\(^2\)

<table>
<thead>
<tr>
<th>Growth Factor</th>
<th>Amount (pg/10^6 platelets)</th>
<th>S.D.</th>
<th>% of Max</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGF</td>
<td>7.59</td>
<td>2.83</td>
<td>13.21</td>
<td>4.92</td>
</tr>
<tr>
<td>bFGF</td>
<td>2.73</td>
<td>0.42</td>
<td>35.58</td>
<td>4.65</td>
</tr>
<tr>
<td>PDGF-BB</td>
<td>11.65</td>
<td>10.42</td>
<td>15.02</td>
<td>10.03</td>
</tr>
<tr>
<td>TGF-β</td>
<td>633</td>
<td>300</td>
<td>49.17</td>
<td>26.29</td>
</tr>
<tr>
<td>VEGF</td>
<td>13.02</td>
<td>7.21</td>
<td>25.37</td>
<td>10.46</td>
</tr>
</tbody>
</table>

**Maximum Concentration (t=20 hours)**\(^2\)

<table>
<thead>
<tr>
<th>Growth Factor</th>
<th>Amount (pg/10^6 platelets)</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGF</td>
<td>60.69</td>
<td>16.19</td>
</tr>
<tr>
<td>bFGF</td>
<td>7.29</td>
<td>1.72</td>
</tr>
<tr>
<td>PDGF-BB</td>
<td>64.41</td>
<td>25.79</td>
</tr>
<tr>
<td>TGF-β</td>
<td>1400</td>
<td>512</td>
</tr>
<tr>
<td>VEGF</td>
<td>54.22</td>
<td>25.70</td>
</tr>
</tbody>
</table>

**DBM used in Bonus™ DBM is proven to contain measureable bone morphogenetic proteins.**\(^1\)
Technique with 1 ml Bonus™ DBM

Figure 1
Twist the elbow to seat perpendicular to the tabs of the 1 ml graft preparation system containing Bonus™ DBM. Ensure that the elbow attachment is well seated in the 1 ml syringe with Bonus™ DBM. If not, push on elbow to seat.

Figure 2
Ensure that the yellow cap on the graft preparation system containing Bonus™ DBM is tightly seated. Attach the hydrating fluid of choice by twisting the syringe on the luer lock fitting. Note: In all subsequent steps, the syringe with hydrating fluid must be pointed down as illustrated in Figure 2.

Figure 3
Pull on the syringe plunger containing the hydrating fluid until fully extended. This will create a vacuum necessary for complete hydration (Figure 3). Release plunger to allow hydrating fluid to infiltrate the graft preparation system. Wait 2 to 3 minutes to proceed.

Figure 4
Use hydrating syringe to lever on the elbow. Attach plunger provided, remove yellow cap and expel hydrated Bonus™ DBM.
Technique with 5-10 ml Bonus™ DBM

Figure 1
Attach the 30 ml vacuum syringe to the valve fitting on the side of the graft preparation system containing Bonus™ DBM. With both hands on the vacuum syringe, pull on the vacuum syringe plunger until fully out — twist plunger to engage the locking mechanism. Remove vacuum syringe and repeat process a second time to ensure desired vacuum.

Figure 2
Holding the graft preparation system at the valve, twist off the 30 ml vacuum syringe. Attach a dispensing unit containing the liquid component onto the valve of the Graft Preparation System with Bonus™ DBM. Pushing in additional fluid will cause a more flowable material.

Figure 3
Detach the syringe. Piston the plunger for ten seconds. This assists with hydration. Prior to removing from chamber, gently pump the plunger two times.

Figure 4
Remove the cap from the end of the graft preparation system and push the graft out of the system using the plunger. The supplemental nozzle can be used to inject the DBM in a fine bead.
Application Possibilities for Bonus™ DBM

Orthopaedic surgery
- Bone Nonunions\textsuperscript{6,7}
- Total Knee Arthroplasty\textsuperscript{8}
- Knee Revisions\textsuperscript{9}
- Bone defects/cysts\textsuperscript{10-12}
- Spinal Fusion\textsuperscript{13,14}
- Ankle/Hindfoot Fusion\textsuperscript{15}
- Revision Total Hip Arthroplasty\textsuperscript{16}
- Tendon Fixation to Metal Implants\textsuperscript{17}

Cranial/Maxillofacial Surgery
- Mandibular Reconstruction\textsuperscript{18}
- Correction of Orbitocranial Defects\textsuperscript{19}
- Reconstruction of Resorbed Maxilla\textsuperscript{20}
- Bone Regeneration\textsuperscript{21,22}

Otolaryntology
- Frontal Sinus Repair\textsuperscript{23}

Bonus™ DBM mixed with platelet-rich plasma applied to knee revision

Bonus™ DBM mixed with bone marrow aspirate for use in spine surgery

Bonus™ DBM mixed with bone marrow aspirate and platelet-rich plasma being applied to a fibular nonunion
References

Patient selection factors to be considered should include: 1. the ability and willingness of the patient to follow instructions; 2. control of weight and activity levels; 3. a good nutritional state.

**CONTRAINDICATIONS**

Infection at the surgical site and/or distant foci of infections that may spread to the surgical site is a contraindication for Bonus™ DBM.

**WARNINGS AND PRECAUTIONS**

1. Bonuses™ DBM is processed and prepared via a proprietary process at Community Tissue Services, Dayton, Ohio.

2. This tissue has been processed with Allowash®, a patented bone and soft tissue cleaning technology under license from LifeNet.

3. Immune rejection of the introduced tissue that may require additional surgery.

4. Do not use Bonus™ DBM if package integrity has been compromised.

5. This tissue is intended for use in one patient on a single occasion only.

6. Once user breaks the container seal, the tissue must be transplanted or discarded.

7. This tissue may not be sterilized or re-sterilized.

8. Do not use for treatment of bone with compromised stability or load bearing value, or within articulating joints.

9. The surgeon is to be thoroughly familiar with Bonus™ DBM material and the surgical procedure prior to use of this tissue.

10. The patient is to be made aware of general risks associated with treatment and the possible adverse effects.

**POSSIBLE ADVERSE EFFECTS**

1. Complications associated with surgery such as hematoma, infection, migration, and other complications that may require additional surgery.

2. Incorrect or lack of bony ingrowth at the treatment site that may require additional surgery.

3. Immune rejection of the introduced tissue that may require additional surgery.

4. The transmission of known pathogens including Human Immunodeficiency Virus (HIV-1, 2, Hepatitis B and C, Human T-Lymphotropic Virus I and II, Syphilis, bacteria, and fungi).

**STERILITY**

This tissue has been processed under aseptic conditions. Bonus™ DBM has been irradiated in its final container with a Cobalt 60 source at 15-25 kGy.

**INSTRUCTIONS FOR USE**

1. Twist the elbow to seat perpendicular to the tabs of the 1 cc Graft Preparation System containing Bonus™ DBM. Ensure that the elbow attachment is well seated in the 1 cc syringe with Bonus™, if not, push on elbow to seat.

2. Ensure that the yellow cap on the Graft Preparation System containing Bonus™ DBM is tightly seated.

3. Attach the hydrating fluid of choice by twisting the syringe on to the Luer Lock fitting. NOTE: in all subsequent steps, the syringe with hydrating fluid must be pointing down.

4. Pull on the syringe plunger containing the hydrating fluid until fully extended. This will create a vacuum necessary for complete hydration.

5. Release plunger to allow the hydrating fluid to infiltrate the Graft Preparation System. Wait 2 to 3 minutes before proceeding.

6. Use hydrating syringe to lever out the elbow. Attach plunger provided, remove yellow cap and expel hydrated Bonus™ DBM.

**STORAGE AND SHELF LIFE**

Storage temperature ranges for Bonus™ DBM are between -25°C and 40°C. Ambient temperature is recommended. No refrigeration is necessary. See package label for expiration date. It is the responsibility of the Tissue Dispensing Service and/or end-user to maintain Bonus™ DBM in the appropriate storage conditions prior to transplant.

**TRACKING AND TRACEABILITY**

Please complete the enclosed Graft Tracking Record and return it to Biomet Biologics, Inc. Federal regulations (21 CFR 290(b)) require proper tracking of human tissue. It is the responsibility of the end-user to provide this tracking information, which enables Biomet Biologics, Inc. to maintain records for the purpose of human tissue post-transplant or any other final disposition (eg. tissue not used and discarded). Adverse outcomes potentially attributable to the tissue must be promptly reported to Biomet Biologics, Inc. Use the peel-off sticker from the label in the patient record.

Caution: Federal law (USA) restricts this tissue to sale by or on the order of a licensed physician. This tissue is intended for use by qualified health care specialists such as physicians, dentists, or podiatrists.

Community Tissue Services and Biomet Biologics, Inc. make no claims concerning the biological or biomechanical properties of the provided tissue. All tissue is recovered, processed, stored, and distributed for use in accordance with the standards of the American Association of Tissue Banks, Community Tissue Services and Biomet Biologics, Inc. disclaim all liability and responsibility for any misuse of tissue provided for clinical application.

Comments regarding this tissue can be directed to: Attn: Regulatory Dept., Biomet, PO Box 587, Warsaw, IN 46581 USA. Fax: 574-372-1683. Patent No. 6,576,249 and other pending patents.

Biomet Biologics, Inc.
56 East Bell Drive
Warsaw, IN 46581 USA

**DESCRIPTION**

Bonus™ Demineralized Bone Matrix (Bonus™ DBM) is processed human bone that has been demineralized and combined with human collagen-derived carrier from the same donor. The final demineralized bone matrix is in a freeze-dried state. Bonus™ DBM is supplied in single use packages for single-patient use.
INDICATIONS FOR USE
Bonus™ DBM can be used to fill bony voids or gaps that have been surgically created or for filling osseous defects in non-weight bearing applications.

Bonus™ DBM may be used with orthopedic, spinal, reconstructive, craniofacial, maxillofacial and periodontal bone grafting procedures. It can be used alone or in combination with autologous bone, or other forms of autologous tissue in grafting procedures of non-weight bearing value. It can be used or hydrated with autologous blood, bone marrow aspirate or autologous blood derived products such as platelet rich plasma and platelet poor plasma. It may also be hydrated with saline or antibiotic solution.

Patient selection factors to be considered should include: 1) the ability and willingness of the patient to follow instructions; 2) control of weight and activity levels; 3) a good nutritional state.

CONTRAINDICATIONS
Infection at the surgical site and/or distant foci of infections that may spread to the surgical site is a contraindication for Bonus™ DBM.

RELATIVE CONTRAINDICATIONS
1. Uncooperative patient, or patient with neurologic disorders who is incapable of following directions, including weight control and activity levels.
2. Pregnancy.
3. Disorders or diseases, which may impair bone formation.

WARNINGS AND PRECAUTIONS
1. Bonus™ DBM contains donated human tissue.
2. This tissue has been processed with Bacitracin and/or Polymyxin B, HCl, alcohol, and sodium phosphate. Traces may remain.
3. Although this tissue has been tested and screened for selected human pathogens, processed under aseptic conditions, and gamma irradiated with a Cobalt 60 source at 15–25 kGy, human derived tissue may still transmit infectious agents.
4. Do not use Bonus™ DBM if package integrity has been compromised.
5. This tissue is intended for use in one patient on a single occasion only.
6. Once user breaks the container seal, the tissue must be transplanted or discarded.
7. This tissue may not be sterilized or re-sterilized.
8. Do not use for treatment of bone with compromised stability or load bearing value, or within articulating joints.
9. The surgeon is to be thoroughly familiar with Bonus™ DBM material and the surgical procedure prior to use of this tissue.
10. The patient is to be made aware of general risks associated with treatment and the possible adverse effects.

POSSIBLE ADVERSE EFFECTS
1. Complications associated with surgery such as hematoma, infection, migration, and other complications that may require additional surgery.
2. Incomplete or lack of bony ingrowth at the treatment site that may require additional surgery.
3. Immune rejection of the introduced tissue that may require additional surgery.
4. The transmission of known pathogens including Human Immunodeficiency Virus 1/2, Hepatitis B and C, Human T-Lymphotropic Virus I and II, Syphilis, bacteria, and fungi.

STERILITY
This tissue has been processed under aseptic conditions. Bonus™ DBM has been irradiated in its final container with a Cobalt 60 source at 15-25 kGy.

INSTRUCTIONS FOR USE
1. Attach the 30 cc vacuum syringe to the valve fitting on the side of the Graft Preparation System containing Bonus™ DBM and pull on the vacuum syringe plunger until fully out-twist plunger to engage the locking mechanism.
2. By holding the Graft Preparation System at the valve, twist off the 30 cc vacuum syringe and attach a dispensing unit containing the liquid hydrating component of surgeon’s choice onto the valve of the Graft Preparation System with Bonus™ DBM. Ensure a minimum of 6cc of fluid in syringe before attaching.
3. Appropriate amount of the liquid component will be dispensed into the Freeze Dried Putty automatically. Detach dispensing unit with the remaining liquid component. Let this mixture hydrate for at least 5 minutes before removing from chamber.
4. Remove the cap from the end of the Graft Preparation System and use the plunger to extract the graft.

STORAGE AND SHELF LIFE
Storage temperature ranges for Bonus™ DBM are between -25°C and 40°C. Ambient temperature is recommended. No refrigeration is necessary. See package label for expiration date. It is the responsibility of the Tissue Dispensing Service and/or end-user to maintain Bonus™ DBM in the appropriate storage conditions prior to transplant.

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The information contained in these package inserts was current on the date this brochure was printed. However, the package insert may have been revised after that date. To obtain a current package insert, please contact Biomet at the contact information provided herein.

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