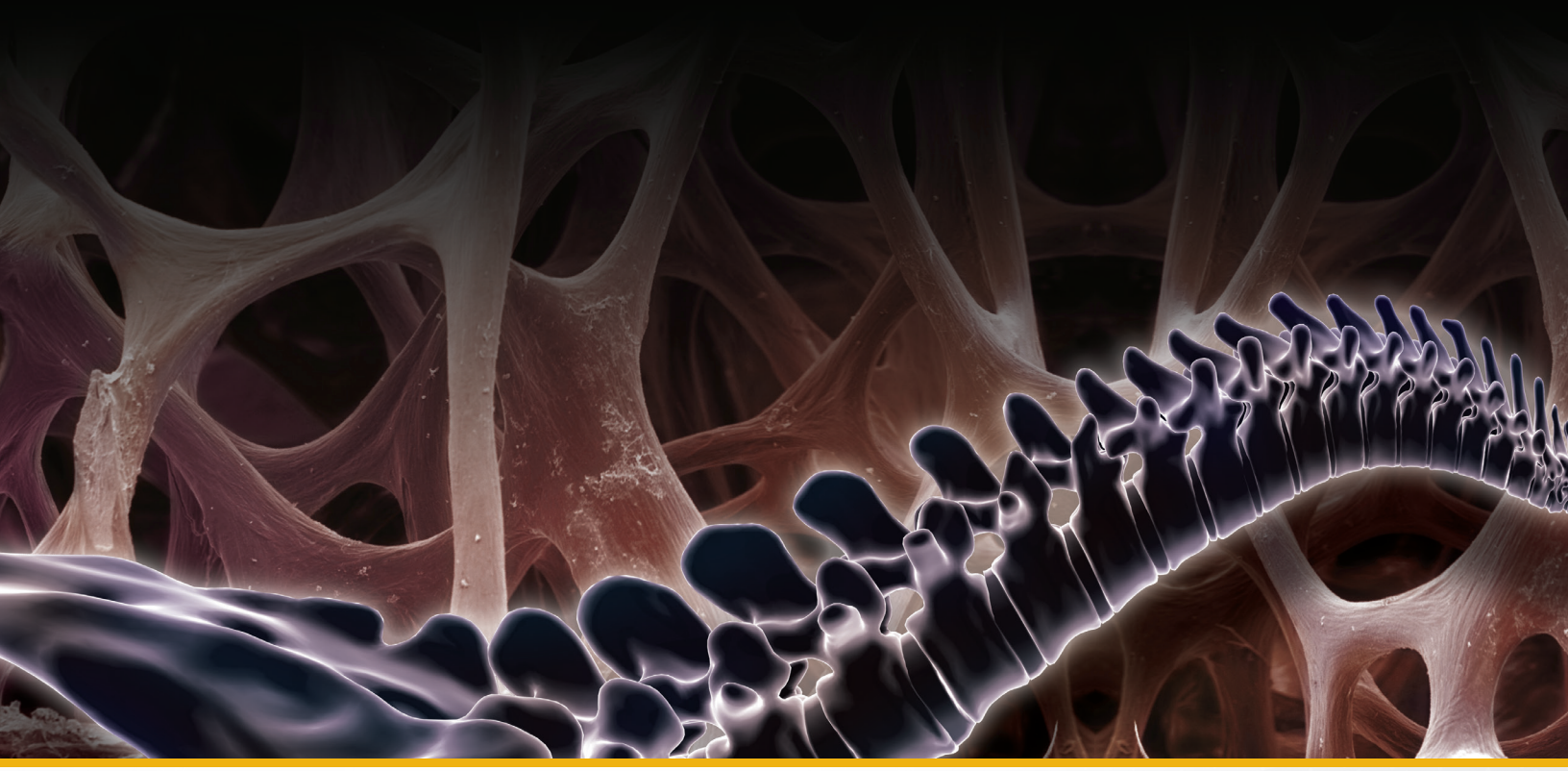
stryker®

Spine



# Stryker Biologics

## Product Catalog

# Introduction

## Stryker Spine

Stryker is one of the world's leading medical technology companies and together with our customers, we are driven to make healthcare better. Stryker has collaborated with the nation's industry-leading tissue organizations to offer a comprehensive portfolio consisting of traditional and proprietary spinal grafts and viable bone matrix, as well as demineralized bone matrix products and synthetic bone grafting substitutes. Our focus on bringing progressive, compelling products to market is guided by our quality first foundation—Stryker fulfills the rigorous certification requirements of the American Association of Tissue Banks and complies with the U.S. Food and Drug Administration regulations for tissue management.

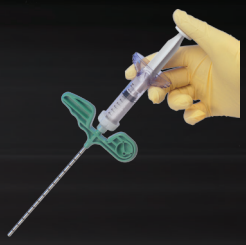
Our spectrum of orthobiologic products for neurosurgical and orthopedic spine procedures is the result of Stryker's responsiveness and commitment to both surgeon and patient needs. Our comprehensive portfolio offers surgeons the right product for each surgical situation.

Stryker offers one of the most comprehensive and diverse spine portfolios to treat a variety of pathologies through a less or minimally invasive surgical approach. Stryker's breadth of offering includes components for every part of the procedure to deliver to you a complete solution.

# Stryker offers one of the most comprehensive and diverse spine portfolios.

## Biologics


Viable Bone Matrix



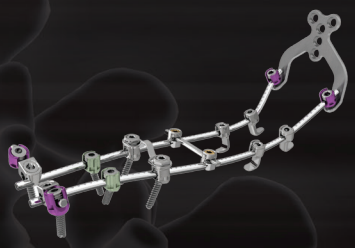
Synthetic

DBM

Allograft

## Cervical

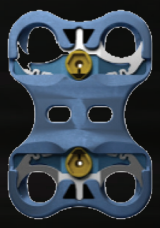
Aviator



Oasys

## Less Invasive/Instruments

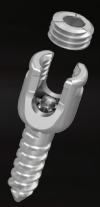
Pedicle Based Retractor



LITe Plate System

ES2

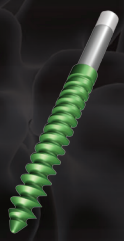
## Thoracolumbar Fixation



Xia 3

Xia 4.5

Radius



Trio

# Products

## Table of Contents

# Product Overview

## Viable Bone Matrix


## Demineralized Bone Matrix (DBM)

## Allograft BIO-Implants

## Synthetic Bone Graft

# Allograft BIO-Implants

## Featuring Preservon Technology

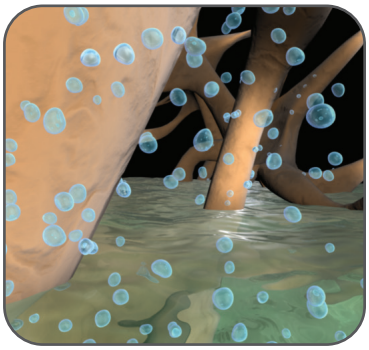
## Why Choose Preservon Allograft BIO-Implants?

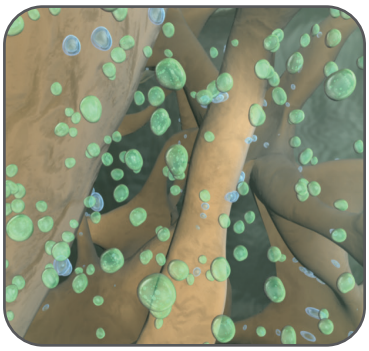
Preservon Allograft BIO-Implants are more efficiently and conveniently stored and handled than grafts treated with conventional preservation methods.

Frozen or freeze-dried allografts can require up to 60 minutes to thaw or re-hydrate, compared to as little as 30 seconds for Preservon treated Allograft BIO-Implants.

## The Future of Allograft BIO-Implant Preservation

Preservon is a proprietary and patented glycerol-based preservation technology that allows allograft BIO-implants to be stored in a fully hydrated state at an ambient temperature. This eliminates the need to freeze or freeze-dry allograft BIO-implants, which helps eliminate prolonged thawing and rehydration times.





### How does it work?

Glycerol, the active ingredient in Preservon, acts as a humectant to maintain both the moisture within the allograft, as well as a bacteriostatic environment. These properties allow ambient temperature storage of the allograft without decay. Widely used as a food additive, glycerol has been used since 1991 as a carrier in commercially available osteobiologics products to enhance handling characteristics.

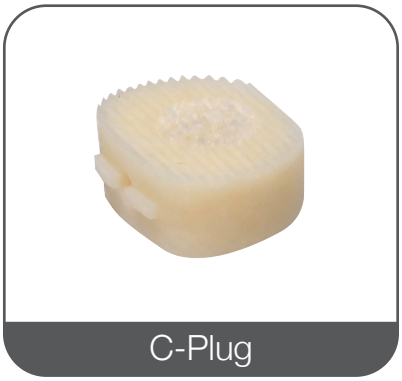
### What are the potential benefits to my patients, hospitals and me?

| | |
|---|---|
| Convenient ambient temperature storage and no rehydration | May help increase OR efficiency |
| Lower possibility of brittle product associated with freeze-drying[1] | Helps preserve product integrity |
| Consistent osteoconductive properties and compressive strength[1] | May help optimize performance |
| No inflammatory response[1] | Can help optimize safety |

# C-Open and C-Plug

## Description

The BIO AVS C-Open and C-Plug implants are monolithic cortical constructs with open and cancellous plug design options. BIO AVS implants are machined from femoral and tibial allograft and are designed for cervical procedures.



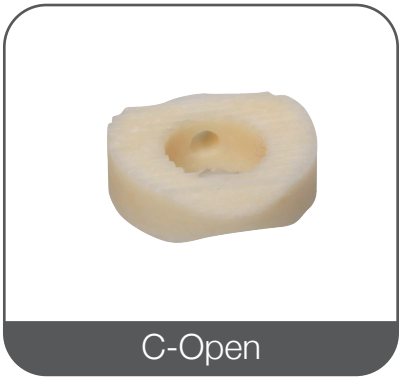
C-Plug

## Technical Specifications

- 12mm anterior-posterior depth
- 14mm medial-lateral width
- 5-10mm heights
- Parallel and 4° lordotic options

## Product Features

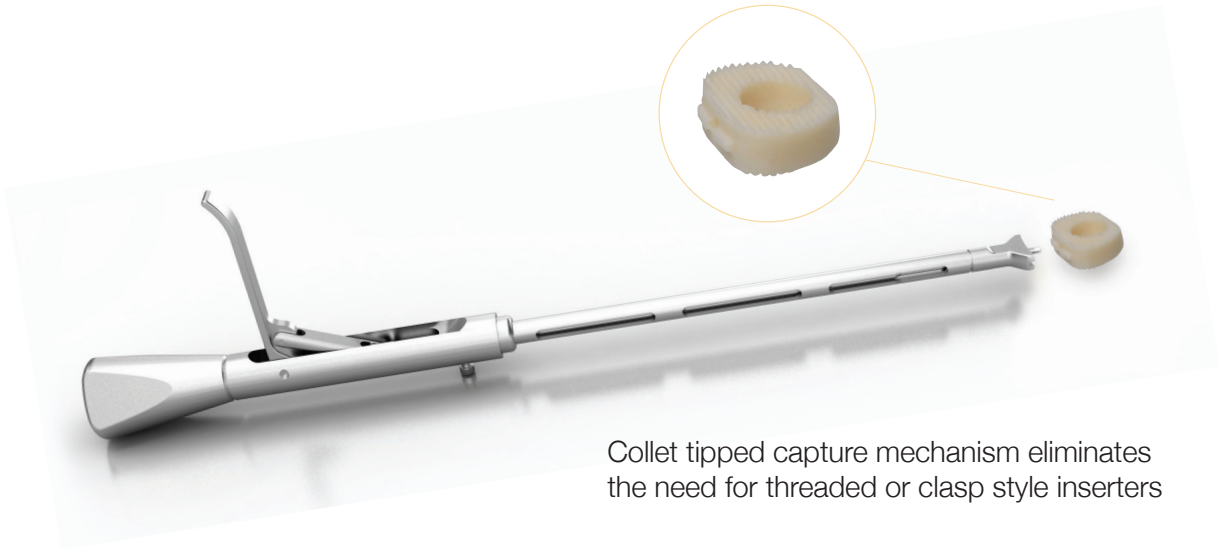
- One-piece cortical construction for optimized biomechanical strength and load dispersion
- Textured surface area helps minimize risk of implant migration and displacement
- Machined to precise dimensions for consistent fit and functionality
- Open and cancellous plug design options
- Chamfered leading edge for ease of insertion
- No rehydration required
- 5-10mm heights
- Preservon treated for fully hydrated ambient temperature storage
- Processed with Allowash XG to achieve a Sterility Assurance Level to $10^{-6}$ (SAL)[2]



C-Open

## Intuitive Instrumentation

- Simplified lever-lock handle allows for rapid assembly/disassembly
- Ridged graft capture mechanism provides more control and tactility during insertion



Collet tipped capture mechanism eliminates the need for threaded or clasp style inserters

# UniLIF

## UniLIF Description

The BIO AVS UniLIF is an allograft posterior lumbar interbody spacer system, designed for both bilateral PLIF and oblique TLIF surgical approaches. Machined from femoral and tibial allograft.

BIO AVS UniLIF

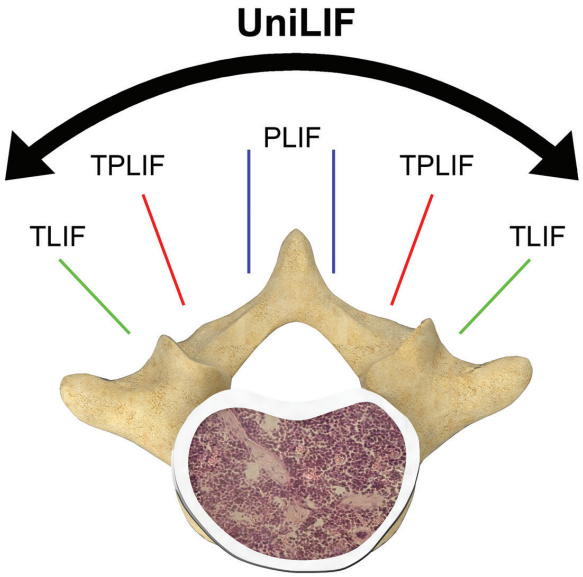
## Technical Specifications

BIO AVS UniLIF (Short)
- Length: 25mm
- Width: 9mm
- 7-15mm Heights (2mm increments)

BIO AVS UniLIF (Long)
- Length: 30mm
- Width: 11mm
- 7-15mm Heights (2mm increments)

## Product Features

- 25mm and 30mm lengths for PLIF and TLIF approaches
- Full cortical parameter for structural support
- Cancellous center to facilitate fusion through graft
- Self-distracting wedge nose to ease insertion
- 1mm isometric serrations on superior and inferior surfaces to help resist expulsion
- Preservon treated for fully hydrated ambient temperature storage
- Processed with Allowash XG to achieve a Sterility Assurance Level to $10^{-6}$ (SAL)[2]



## Description

The BIO AVS AL implant is a monolithic, cortical construct machined from femoral allograft. Designed for Anterior Lumbar Interbody Fusion (ALIF) procedures.

BIO AVS AL

## Technical Specifications

- Anterior posterior depth - 23mm minimum; 27mm maximum
- Medial lateral width - 23mm minimum; 30 mm maximum
- 10-18mm heights (2mm increments)
- 4˚, 8˚, and 12˚ lordotic options

## Product Features

- One-piece cortical ring for optimized biomechanical strength and load dispersion
- Textured surface area helps minimize risk of implant migration and displacement
- Machined to precise dimensions for consistent fit and functionality
- Open design to accommodate bone graft material of choice
- Chamfered leading edge for ease of insertion
- Preservon treated for fully hydrated ambient temperature storage
- Processed with Allowash XG to achieve a Sterility Assurance Level to $10^{-6}$ $(SAL)^{2}$

BIO AVS AL is ONLY compatible with SLIDE Instrumentation.

# BIO Wedge

## Unicortical

### Description

Precision cut cancellous block with a single cortical face. Recovered from the femoral condyles, femoral heads, distal tibia, and talus.

Unicortical

### Technical Specifications

- 11mm anterior-posterior depth
- 14mm medial-lateral width
- 5-10mm heights
- Parallel

### Clincial Applications

- Anterior Cervical Fusion

### Product Features

- Preservon treated for fully hydrated ambient temperature storage
- Provides an osteoconductive matrix for incorporation
- Pre-sized for convenience and intraoperative efficiency
- Processed with Allowash XG to achieve a Sterility Assurance Level to $10^{-6}$ (SAL)[2]

## Tricortical

### Description

Tricortical graft processed from the patella.

Tricortical

### Technical Specifications

- 11-17mm anterior-posterior depth
- 12-15mm medial-lateral width
- 5-10mm heights
- Parallel

### Clincial Applications

- Anterior Cervical Fusion

### Product Features

- Preservon treated for fully hydrated ambient temperature storage
- Structural support provided by cortical aspects
- Provides an osteoconductive matrix for incorporation
- Pre-sized for convenience and intraoperative efficiency
- Processed with Allowash XG to achieve a Sterility Assurance Level to $10^{-6}$ (SAL)[2]

# BIO Wedge

## Iliac Crest

### Description

Tricortical graft recovered from the crest of the ilium.

Iliac Crest

### Technical Specifications

- Minimum 25mm anterior-posterior depth
- Minimum 8mm medial-lateral width
- 6-10mm and 18mm heights
- Parallel

### Clincial Applications

- Anterior Cervical Fusion
- Corpectomy
- Ankle Fusion

### Product Features

- Preservon treated for fully hydrated ambient temperature storage
- Structural support provided by cortical aspects
- Provides an osteoconductive matrix for incorporation
- Pre-sized for convenience and intraoperative efficiency
- Processed with Allowash XG to achieve a Sterility Assurance Level to $10^{-6}$ (SAL)[2]

# BIO Shaft

## Femoral

### Description

BIO Shaft Femoral grafts are precision cut segments of the femoral diaphysis.


Femoral

### Technical Specifications

- 23-27mm anterior-posterior diameter
- 23-30mm medial-lateral diameter
- 60 and 100mm lengths

### Applications

- Corpectomy
- Fracture Management
- Tumor Resection

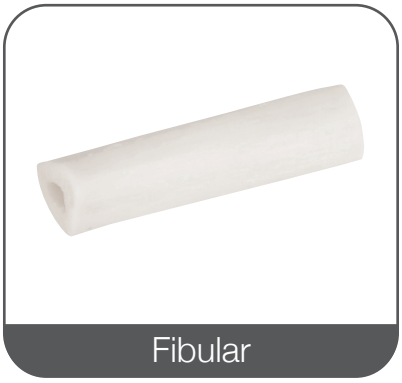
### Product Features

- Preservon treated for fully hydrated ambient temperature storage
- Monolithic structural support provided by cortical ring
- Can be customized to the specific needs of the patient
- Provides an osteoconductive matrix for incorporation
- Processed with Allowash XG to achieve a Sterility Assurance Level to $10^{-6}$ $(SAL)^{2}$

## Fibular

### Description

BIO Shaft Fibular grafts are precision cut segments of the fibular diaphysis.


Fibular

### Technical Specifications

- 8-15mm diameter
- 40, 60, and 100mm lengths

### Applications

- Corpectomy
- Anterior Cervical Fusion
- Fracture Management
- Tumor Resection

### Product Features

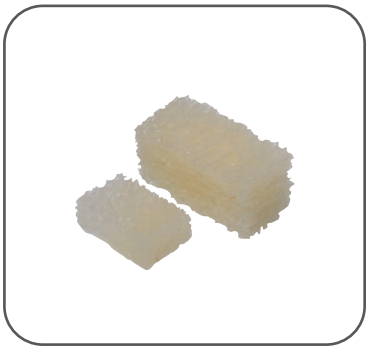
- Preservon treated for fully hydrated ambient temperature storage
- Monolithic structural support provided by cortical ring
- Can be customized to the specific needs of the patient
- Provides an osteoconductive matrix for incorporation
- Processed with Allowash XG to achieve a Sterility Assurance Level to $10^{-6}$ $(SAL)^{2}$

# BIOExpand

BIOExpand is comprised of 100% demineralized cancellous bone providing an osteoconductive scaffold for cell attachment that, when rehydrated, produces a sponge-like effect allowing the graft to be compressed to fit in and around a variety of bony defects.

## Product features[3]:

- Natural osteoconductive scaffold for cell attachment
- Osteoinductive potential by exposed natural growth factors through the demineralization process.
- Malleable, elastic, compressible when rehydrated
- Ambient temperature storage
- Naturally absorbs and retains bioactive fluids like blood and Bone Marrow Aspirate (BMA)
- Sterilized using Allowash XG technology achieving sterility without compromising the inherent osteoconductive or osteoinductive potential.
- 6 sizes available



# BIO Chips

## Cancellous

### Product Features

- Provides osteoconductive matrix
- Offered in two particle size ranges: 1-4mm and 1-8mm
- Offered in four sizes: 5cc, 15cc, 30cc, and 60cc
- Preservon treated for fully hydrated ambient temperature storage
- Processed with Allowash XG to achieve a Sterility Assurance Level to $10^{-6}$ (SAL)[2]

Cancellous

## Cortico-Cancellous

### Product Features

- Provides osteoconductive matrix
- Approximately equal amounts of crushed cortical and crushed cancellous
- Offered in two particle size ranges: 1-4mm and 1-8mm
- Offered in two sizes: 30cc and 60cc
- Preservon treated for fully hydrated ambient temperature storage
- Processed with Allowash XG to achieve a Sterility Assurance Level to $10^{-6}$ (SAL)[2]

Cortico-Cancellous

# BIO DBM with Chips

## DBM with Cancellous

### Product Features

- A mix of demineralized bone material and cancellous chips
- Cancellous particle size 1-8mm
- Provides an osteoinductive component and osteoconductive matrix
- Easily mixed with autograft
- 100% allograft
- Demineralized with patented PAD process targeting 1-4% residual calcium[3]
- Processed with Allowash XG to achieve a Sterility Assurance Level to $10^{-6}$ (SAL)[2]

Cancellous

# PL

## Description

The AlloCraft PL implant is a monolithic, cortical construct machined from femoral allograft. Designed for use in Posterior Lumbar Interbody Fusion (PLIF) procedures.

AlloCraft PL

## Technical Specifications

- 8mm width x 22mm lengths
- 8-16mm heights (2mm increments)
- 5° posterior lordosis

## Product Features

- One-piece cortical construction for optimized biomechanical strength and load dispersion
- Textured surface area helps minimize risk of implant migration and displacement
- Machined to precise dimensions for consistent fit and functionality
- Bullet-shaped nose facilitates insertion into the disc space
- Freeze dried. Ambient temperature storage.

# TL

## Description

The AlloCraft TL implant is a monolithic, cortical construct machined from femoral allograft. Designed for use in Transforaminal Lumbar Interbody Fusion (TLIF) procedures.

AlloCraft TL

## Technical Specifications

- 8mm width x 26mm length
- 8-16mm heights (2mm increments)
- Parallel

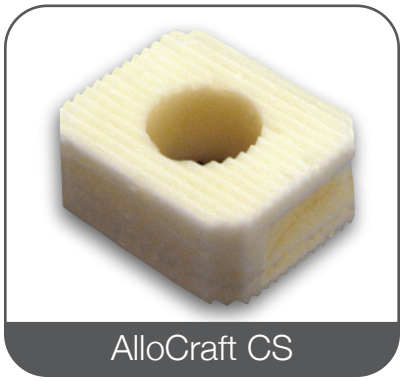
## Product Features

- One-piece cortical construction for optimized biomechanical strength and load dispersion
- Textured surface area helps minimize risk of implant migration and displacement
- Machined to precise dimensions for consistent fit and functionality
- Bullet-shaped nose facilitates insertion into the disc space
- Freeze dried. Ambient temperature storage.

# CS

## Description

The AlloCraft CS implant is a monolithic, cortical construct machined from femoral or tibial allograft. Designed for cervical procedures.



AlloCraft CS

## Technical Specifications

- 14mm medial-lateral width x 12mm anterior-posterior depth
- 5-9mm heights
- 6.5mm lumen
- Parallel

## Product Features

- One-piece cortical construction for optimized biomechanical strength and load dispersion
- Textured surface area helps minimize risk of implant migration and displacement
- Machined to precise dimension for consistent fit and functionality
- Open design to accommodate bone graft material of choice
- Chamfered leading edge for ease of insertion
- Freeze dried. Ambient temperature storage.

# CL & CP

## Description

The AlloCraft CP and CL implants are monolithic cortical constructs with cancellous plugs. Machined from femoral or tibial allograft. Designed for cervical procedures.

AlloCraft CL & CP

## Technical Specifications

- 14mm medial-lateral width x 12mm anterior-posterior depth
- 5-9mm heights
- 6.5mm lumen
- Parallel (CP) and 5˚ lordotic (CL) options

## Product Features

- One-piece cortical ring for optimized biomechanical strength and load dispersion
- Textured surface area helps minimize risk of implant migration and displacement
- Machined to precise dimension for consistent fit and functionality
- Central cancellous pluge facilitates fusion through the graft
- Chamfered leading edge for ease of insertion
- Freeze dried. Ambient temperature storage.

# CA

## Description

The AlloCraft CA implant is a three-piece, cortico-cancellous graft machined from femoral or tibial allograft. Designed for cervical procedures.

AlloCraft CA

## Technical Specifications

- 14mm medial-lateral width x 12mm anterior-posterior depth
- 5-10mm heights
- 5° lordosis

## Product Features

- Proprietary cortico-cancellous assembly is designed to provide load-bearing strength and stability
- Textured surface area helps minimize risk of implant migration and displacement
- Machined to precise dimensions for consistent fit and functionality
- Chamfered leading edge for ease of insertion
- Freeze dried. Ambient temperature storage.

# Demineralized Bone Matrix

## Gel, Putty and Putty Plus

- Demonstrated equivalent bone formation results to autograft in standard posterolateral fusion model in adult rabbits[4]
- Reversed Phase Medium Carrier is designed to provide excellent handling
- Formulated to resists irrigation
- Every lot is tested to confirm osteoinductive potential[5]
- Putty Plus configurations contains cancellous bone[5]

Putty, Gel and Putty Plus

### Gel
- Syringe container
- 1, 5 and 10cc

### Putty
- Vial container
- 1, 2.5, 5 and 10cc

### Putty Plus
- Vial container
- Contains cancellous bone
- 5 and 10cc

Gel

Gel

Putty/Putty Plus

Putty/Putty Plus

# Shapes

## BIO DBM Shape

Easily molded into small anatomy applications

- Designed for rapid hydration and high volume retention of blood or saline
- Pliable consistency allows for easy integration of local bone/allograft chips
- 1, 2.5, and 5cc sizes

Shapes

# Boats

## BIO DBM Boat

- Deep trough-like design engineered to deliver local bone/allograft chips
- Designed for rapid hydration and high volume retention of blood or saline
- Long and short sizes to address single and multi-level placement as part of posterolateral fusion procedures
- 10, 20, and 40cc sizes

Boats

# Viable Bone Matrix

## BIO[4]

BIO[4] is a viable bone matrix containing endogenous bone forming cells including mesenchymal stem cells, osteoprogenitor cells and osteoblasts as well as osteoinductive and angiogenic growth factors. BIO[4] possesses all four characteristics involved in bone repair and regeneration: osteoconductive, osteoinductive, osteogenic, and angiogenic.[6, 7, 8] It is an alternative to autograft that minimizes the potential for harvest site co-morbidities. BIO[4] was developed by Osiris Therapeutics, the creators of the original allograft cellular bone matrix. Features for BIO[4] include:

- Next generation viable bone matrix
- Lot tested for the presence of VEGF (vascular endothelial growth factors)[7]
- Ready to use out of the package; no decanting is required and thaws in 15 minutes
- Differentiated handling compared to the competition
- Contains ≥ 600,000 cells (endogenous bone forming cells) per cc[7]
- Lot tested for ≥70% cell viability post-thaw[7]
- Non-immunogenic[7]

BIO[4] is processed utilizing proprietary methods. Each BIO[4] lot is processed from a qualified single donor that undergoes extensive serology, sterility and bioburden testing and a full review of medical records by the tissue bank Medical Director.

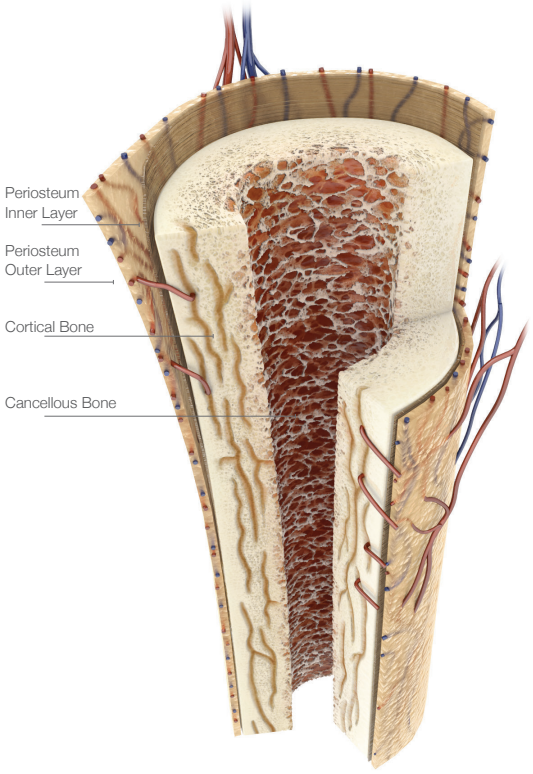
# BIO[4] Composition

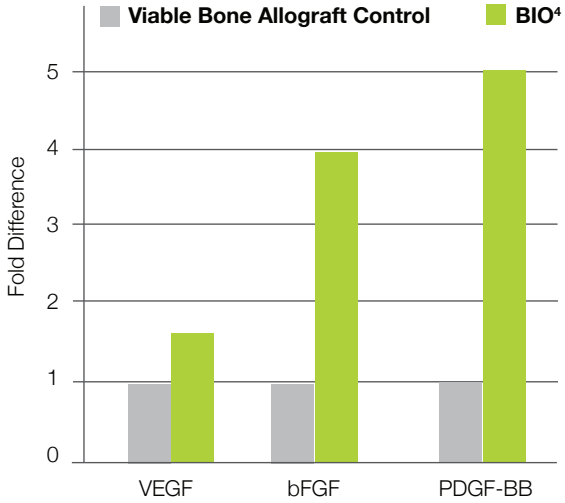
BIO[4]'s proprietary formulation includes all components of bone – cancellous and cortical bone and periosteum. Careful processing preserves these components needed for bone formation while removing the elements that might elicit an immunogenic response.

The scaffold, cells and signals are derived from cancellous bone, bone chips and demineralized cortical bone. Bone periosteum is carefully processed to preserve angeiogenic growth factors. The presence of periosteum further improves handling properties.[7]

All components of BIO[4] are from allograft tissue: cancellous bone, cortical bone and periosteum. Processing of the bone periosteum retains growth factors that support angiogenesis, such as the vascular endothelia growth factor VEGF[8].

As shown in the accompanying chart, the presence of angiogenic signals in BIO[4] was confirmed using ELISA. BIO[4] showed higher presence of endogenous angiogenic growth factors compared to a similar bone allograft formulation lacking the periosteum (viable bone allograft control). VEFG, bFGF, and PDGF-BB are dectectable to higher degree in BIO[4] due to the presence of periosteum.[7]




BIO[4] showed higher presence of angiogenic signals compared to similar bone allograft formulations[7] using ELISA.

# Synthetics

## Vitoss Product Platform

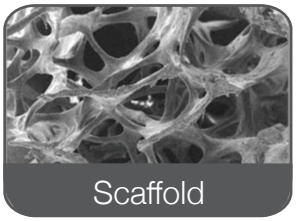
### The #1 Selling Synthetic Bone Graft[9]

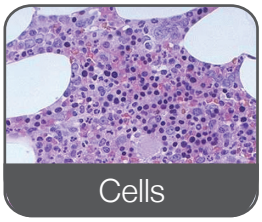
Vitoss continues to be the #1 selling synthetic graft for the simplest reason... it works and has human clinical data to support its efficacy. Vitoss has been implanted over 600,000 times worldwide.[10] Vitoss has been studied in multiple clinical evaluations including the two prospective and peer reviewed studies highlighted below.

| | **The Spine Journal, February 2008**<br>Epstein, N.E., An Analysis of Noninstrumented Posterolateral Lumbar Fusions Performed in Predominantly Geriatric Patients Using Lamina Autograft and Beta-Tricalcium Phosphate. | **The Spine Journal, June 2009**<br>Epstein, N.E., Beta-Tricalcium Phosphate: Observation of Use in 100 Posterolateral Lumbar Instrumented Fusions. |
|---|---|---|
| **Study Design** | Prospective; 60 patients using Noninstrumented PLF; Average age = 70 years | Prospective; 100 patients with lumbar spinal stenosis; Multisegment laminectomies (avg. 3.6 segments) and one segment (78 patients) or two segment (22 patients) instrumented PLF |
| **Outcome Measures** | CT scans - Fusion assessment; Dynamic X-rays; Fusion assessed separately by 2 neuro-radiologists blinded to the treatment; Post-operative outcomes using SF-36; 3, 6, 12, and 24 months follow up | Dynamic X-rays; 2D-CT Scans; Post-operative outcomes using SF-36; Fusion assessed separately by 2 neuroradiologists blinded to the treatment; 3, 4, 5, 6, and 12 month follow up with a minimum of 2.5 years and maximum of 5.0 years (avg. 3.1 years) |
| **Results** | Successful fusion in 85% of patients (51/60) when judged by CT and F/E | Successful fusion in 95% of patients (95/100) when judged by CT and Dynamic X-ray |

### The Gold Standard

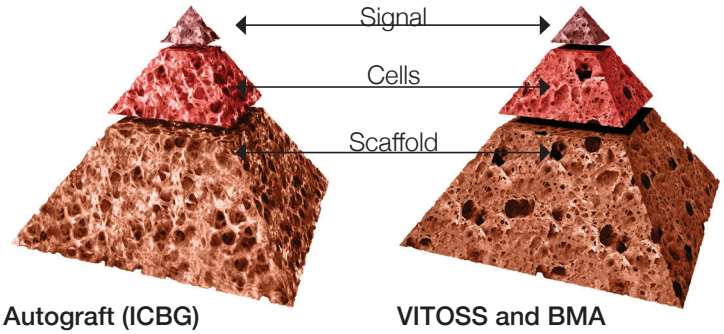
Iliac Crest Bone Graft (ICBG) has a Calcium Phosphate (CaP) surface with an open, inter-connected structure that serves as a scaffold.


Scaffold


Cells

ICBG contains bone marrow rich with mesenchymal stem cells and hematopoetic stem cells that facilitate bone regeneration and neo-vascularization. In addition, ICBG provides signals that help drive bone formation.

VITOSS + BMA (Bone Marrow Aspirate) resembles ICBG, the gold standard, in that it has the same three components: SCAFFOLD, CELLS and SIGNALS.[11]




**Autograft (ICBG)** **VITOSS and BMA**

# Physical Characteristics

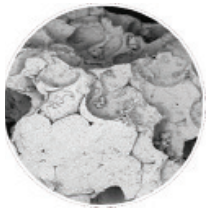
## Structure

Despite having similar chemistries, many products perform differently due to different structure. Vitoss has an open-interconnected structure that facilitates 3-D bone regeneration.[12]

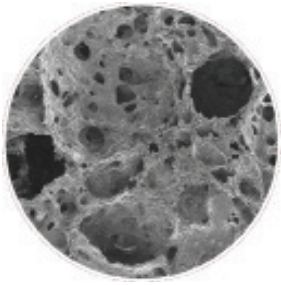
3D Regeneration of Bone

## Porosity

Only materials with interconnected porosity will allow for 3-D regeneration of bone as opposed to creeping substitution. Additionally, increased porosity has been shown to lead to higher rates of bony ingrowth (in an animal model).4 Vitoss is a highly porous calcium-phosphate (up to 90% porous).[13]



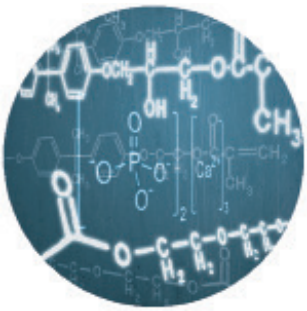
Other scaffolds



Vitoss viewed under scanning electron microscope

## Chemistry

Chemistry affects the rate of resorption. Bone grafts should resorb as new bone forms in a physiologic time frame. Vitoss is composed of ß-TCP and is stable at physiologic pH. It resorbs during the natural remodeling process of bone. Evidence suggests that ß-TCP resorbs in a clinically relevant time frame.[14]

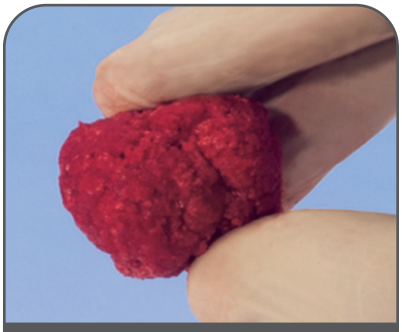


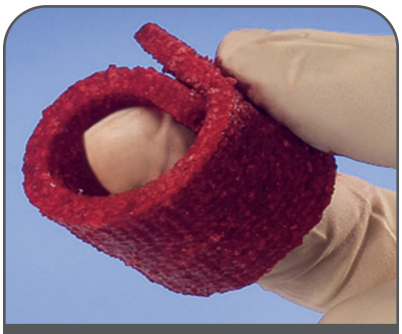
# Physical Characteristics

Vitoss is a versatile material that comes in various forms to meet your bone grafting needs.

## Foam Pack
### Description

- Stable in a fluid environment
- Soaks and holds bone marrow
- Moldable
- Available in Vitoss, Vitoss BA, Vitoss BA2X, and Vitoss BiModal


Foam Pack


Foam Strip

## Foam Strip
### Description

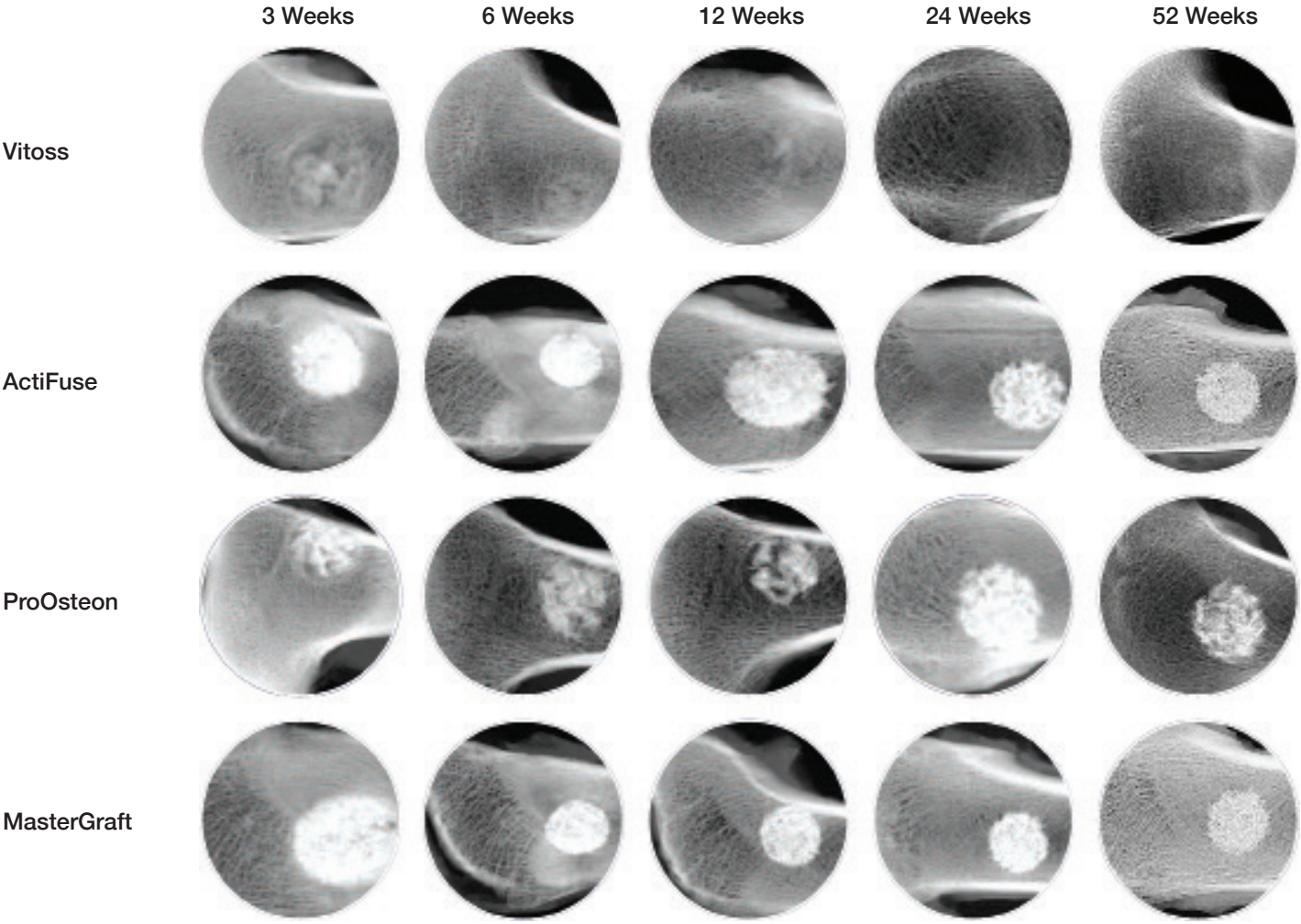
- Flexible pre-formed Strip (when wet)
- Soaks and holds bone marrow
- Compression resistant
- Easily cut
- Available in Vitoss, Vitoss BA

## Morsels and Blocks
### Description

- Good for large graft volume applications
- Cost comparative to cancellous chips
- Available in Vitoss

Morsels

# Not All Scaffolds are Created Equal

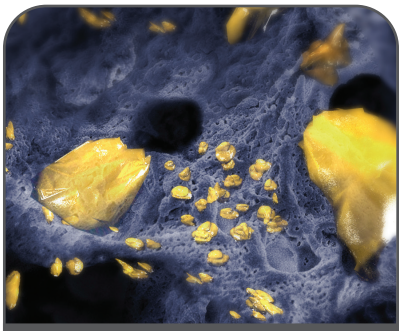



Comparison of Vitoss to ActiFuse, ProOsteon, and MasterGraft in a canine metaphyseal study in order to radiologically compare healing at 3, 6, 12, 24, and 52 weeks. A 10mm x 22mm drill defect was created in the proximal humerus and filled with 2cc of bone graft.[15]

# Vitoss BA

## Bioactive Glass - Mechanism of Action

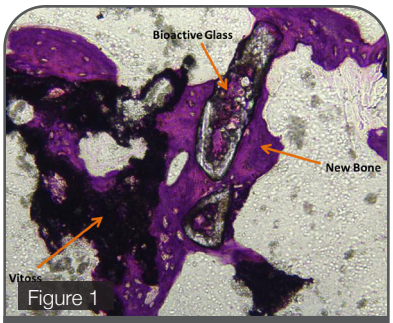
Literature shows that bioactive glass exhibits good bonding-to-bone properties in animal models.[16-18] Upon implantation, the ionic constituents (Silicon, Sodium, and Calcium) of bioactive glass are released into the surrounding environment and react with bodily fluids.[19-22] This reaction produces the deposition of a thin layer of physiologic calcium phosphate at its surface, favorable for osteoblast attachment.[23] This is commonly referred to as a bioactive effect.[16-18, 21, 24-26] This may lead to the bonding of new bone to the scaffold.



Bioactive glass

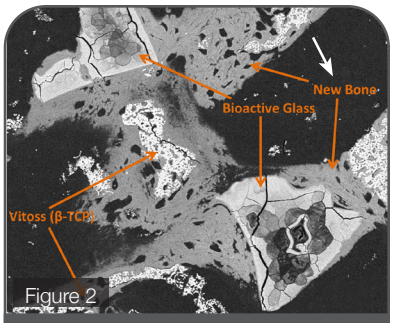
Vitoss BA has a unique porosity, structure, and chemistry to drive 3D regeneration of bone. The addition of bioactive glass helps create a surface favorable for osteoblast attachment and assists the host to regenerate new bone.[16-18, 21, 24-26]

**Figure 1**
Hematoxylin and Eosin stained sample of Vitoss BA at 6 weeks of implantation in a canine metaphyseal defect. New bone is forming between morsels of the Vitoss scaffold, resulting in an interconnected trabecular unit.




Product: VITOSS

**Figure 2**
Backscattered electron (BSE) image of an unstained histology slide from Vitoss BA at 6 weeks of implantation in a canine metaphyseal defect. New bone can be seen enveloping the glass particle and bridging the Vitoss scaffold.




Product: VITOSS

# Vitoss BA2X

## A little extra can make a difference

Vitoss BA2X Bioactive Bone Graft Substitute, which contains increased levels of bioactive glass, has been shown through in-vitro testing to induce two times the deposition of calcium phosphate onto the surface of the implant while retaining the same handling properties.[27]

**Figure 3**
SEM Image of the bioactivity of Vitoss BA2X after 7 days in Simulated Body Fluid. A calcium phosphate layer is seen deposited on the surface of the beta-TCP and collagen matrix.

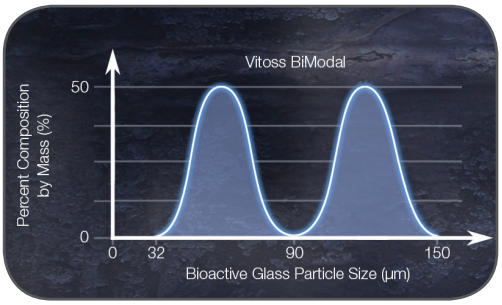

Vitoss BA2X Foam Pack

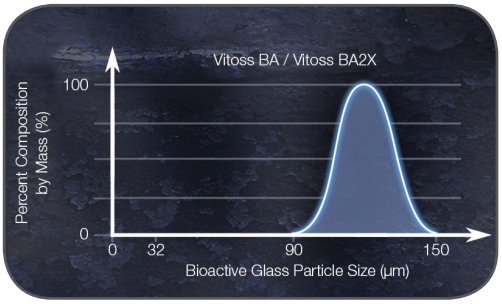
# Vitoss BiModal

## Enhance bioactivity through bimodal technology development

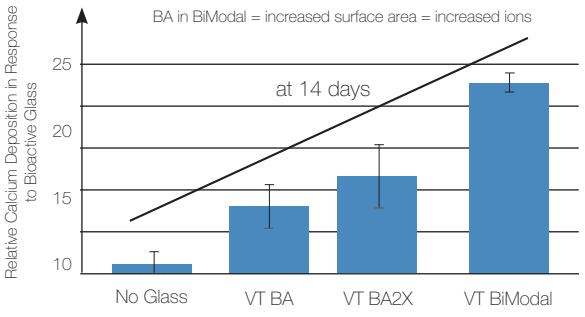
**Vitoss BiModal features:**

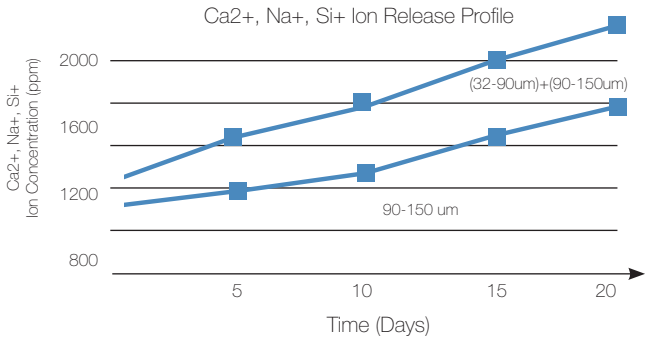
- An ultraporous, open inter-connected structure which guides the 3-dimensional regeneration of bone[12]
- Bimodal bioactive glass particles which promote the deposition of calcium phosphate on the implant surface[28]
- A broader range of particle size distribution leading to an increased surface area of bioactive glass and both an immediate burst and sustained release of $Ca^{2+}$, $Na^{+}$, $Si^{+}$ ions[29]




Relative Cellular Calcium Deposition Between Vitoss Products




## Increased calcium phosphate deposition with Vitoss BiModal

***Greater Initial Burst**

The 32-90 µm bioactive glass particles kickstart the $Ca^{2+}$, $Na^{+}$,and $Si^{+}$ ion release. Bioactive glass leads to a gel-like surface layer that mineralizes and promotes the deposition of calcium phosphate on the implant surface favorable for osteoblast attachment and bone formation.[23, 29]

****Sustained Release**

In-vitro and animal studies have shown that upon contact with bodily fluid, bioactive glass particles:

- Release ions into the immediate environment[23]
- Induce deposition of calcium phosphate on the implant[12]
- Create a surface favorable for osteoblast attachment and bone formation[23]

* As shown in in-vitro studies
** The response of bioactive forms of Vitoss has not been assessed in any animal study or clinical investigation and the results from laboratory testing may not be predictive of human clinical experience.

# Bone Marrow Aspiration and Delivery

## Imbibe Bone Marrow Aspiration and Delivery System

### Bone Marrow

**Less invasive**

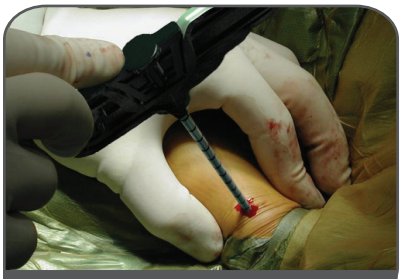
BMA is a safe alternative to iliac crest harvest without associated complications or morbidity. 900(+) patients with bone marrow aspiration (16-200mL) showed no infection, no hematoma, no chronic pain, and only 2 bruises.[30]

**BMA enhances fusion over ICBG alone**

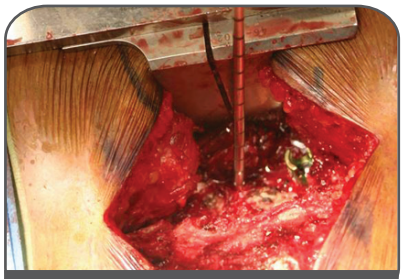
A pre-clinical evaluation (posterolateral fusion) showed 61% fusion in ICBG + BMA versus 25% fusion in ICBG + blood at 12 weeks.[31]

**BMA enhances graft incorporation**

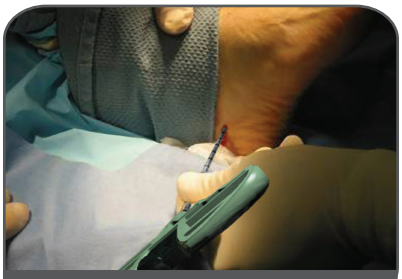
There was a statistically significant decrease in radioluscent lines on x-rays of knees grafted with marrow versus those without. "Iliac marrow is useful as a bone grafting material to enhance the biological formation in porous coated implants."[32]



Iliac Crest (PSIS, ASIS)



Vertebral Body (via pedicle)



Calcaneus

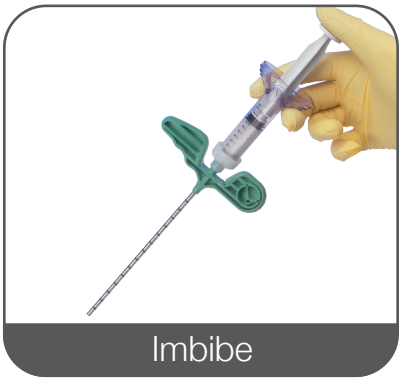
### BMA Harvesting Sites

Bone marrow can easily be aspirated from several anatomical locations throughout the body. Vitoss can be used with or without bone marrow aspirate.

# Imbibe Bone Marrow Aspiration and Delivery System

## Description

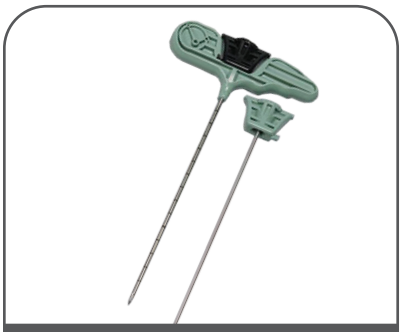
The Imbibe bone marrow aspiration needles provide a minimally invasive way to harvest bone marrow. These needles come with both sharp beveled or trocar stylets, which are color coded to distinguish each needle.



Imbibe

## Product Features:

- Bullet-tip stylet design for controlled navigation
- Trocar and bevel cutting stylet to penetrate cortical bone
- Color-coded stylets to quickly and easily identify sharp-tip vs. bullet-tip design
- Optimized fenestrated hole design and placement
- Ergonomic handle for surgeon control and comfort
- Unique snap-lock design promotes a secure connection between stylet and handle
- Hammering platform
- 8 needle sizes / styles available
- Versatility, useful for multiple anatomic locations



Needles

Syringes

Needles Sizes:

- 11 gauge x 4 inch
- 11gauge x 6 inch
- 8 gauge x 6 inch
- 8 gauge x 8 inch
- Fenestrated 8 gauge x 6 inch

Syringes Sizes:

- 10cc
- 20cc
- 30cc

# Allograft BIO-Implants

## BIO AVS C-Open, C-Plug

### BIO AVS C-Open

| Description | Reference # | Sizing | | |
|---|---|---|---|---|
| BIO AVS C-Open 4˚ | 77101054 | H=5mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Open 4˚ | 77101064 | H=6mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Open 4˚ | 77101074 | H=7mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Open 4˚ | 77101084 | H=8mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Open 4˚ | 77101094 | H=9mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Open 4˚ | 77101104 | H=10mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Open 0˚ | 77101050 | H=5mm | 0˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Open 0˚ | 77101060 | H=6mm | 0˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Open 0˚ | 77101070 | H=7mm | 0˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Open 0˚ | 77101080 | H=8mm | 0˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Open 0˚ | 77101090 | H=9mm | 0˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Open 0˚ | 77101100 | H=10mm | 0˚ Lordosis | 14(w) x 12(d) |

### BIO AVS C-Plug

| Description | Reference # | Sizing | | |
|---|---|---|---|---|
| BIO AVS C-Plug 4˚ | 77102054 | H=5mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Plug 4˚ | 77102064 | H=6mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Plug 4˚ | 77102074 | H=7mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Plug 4˚ | 77102084 | H=8mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Plug 4˚ | 77102094 | H=9mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Plug 4˚ | 77102104 | H=10mm | 4˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Plug 0˚ | 77102050 | H=5mm | 0˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Plug 0˚ | 77102060 | H=6mm | 0˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Plug 0˚ | 77102070 | H=7mm | 0˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Plug 0˚ | 77102080 | H=8mm | 0˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Plug 0˚ | 77102090 | H=9mm | 0˚ Lordosis | 14(w) x 12(d) |
| BIO AVS C-Plug 0˚ | 77102100 | H=10mm | 0˚ Lordosis | 14(w) x 12(d) |

# BIO AVS UniLIF Bone

## Long: 11mm (W) x 30mm (L)

| Description | Reference # | Sizing |
|---|---|---|
| BIO AVS UniLIF 7mm | 96007 | 7mm (H) x 30mm (L) x 11mm (W) |
| BIO AVS UniLIF 9mm | 96009 | 9mm (H) x 30mm (L) x 11mm (W) |
| BIO AVS UniLIF 11mm | 96011 | 11mm (H) x 30mm (L) x 11mm (W) |
| BIO AVS UniLIF 13mm | 96013 | 13mm (H) x 30mm (L) x 11mm (W) |
| BIO AVS UniLIF 15mm | 96015 | 15mm (H) x 30mm (L) x 11mm (W) |

## Short: 9mm (W) x 25mm (L)

| Description | Reference # | Sizing |
|---|---|---|
| BIO AVS UniLIF 7mm | 95007 | 7mm (H) x 25mm (L) x 9mm (W) |
| BIO AVS UniLIF 9mm | 95009 | 9mm (H) x 25mm (L) x 9mm (W) |
| BIO AVS UniLIF 11mm | 95011 | 11mm (H) x 25mm (L) x 9mm (W) |
| BIO AVS UniLIF 13mm | 95013 | 13mm (H) x 25mm (L) x 9mm (W) |
| BIO AVS UniLIF 15mm | 95015 | 15mm (H) x 25mm (L) x 9mm (W) |

## BIO AVS AL

| Description | Reference # | Sizing |
|---|---|---|
| BIO AVS AL | 77701004 | 10mm |
| BIO AVS AL | 77701204 | 12mm |
| BIO AVS AL | 77701404 | 14mm |
| BIO AVS AL | 77701604 | 16mm |
| BIO AVS AL | 77701804 | 18mm |
| BIO AVS AL | 77701008 | 10mm |
| BIO AVS AL | 77701208 | 12mm |
| BIO AVS AL | 77701408 | 14mm |
| BIO AVS AL | 77701608 | 16mm |
| BIO AVS AL | 77701808 | 18mm |
| BIO AVS AL | 77701012 | 10mm |
| BIO AVS AL | 77701212 | 12mm |
| BIO AVS AL | 77701412 | 14mm |

# BIO Wedge

## Unicortical

| Description | Reference # | Sizing |
|---|---|---|
| BIO Wedge Unicortical | 7770605 | 14x11 Height=5mm |
| BIO Wedge Unicortical | 7770606 | 14x11 Height=6mm |
| BIO Wedge Unicortical | 7770607 | 14x11 Height=7mm |
| BIO Wedge Unicortical | 7770608 | 14x11 Height=8mm |
| BIO Wedge Unicortical | 7770609 | 14x11 Height=9mm |
| BIO Wedge Unicortical | 7770610 | 14x11 Height=10mm |

*11mm Anterior-Posterior Depth, 14mm Medial-Lateral Width

## Tricortical

| Description | Reference # | Sizing |
|---|---|---|
| BIO Wedge Tricortical | 7770705 | Height=5mm |
| BIO Wedge Tricortical | 7770706 | Height=6mm |
| BIO Wedge Tricortical | 7770707 | Height=7mm |
| BIO Wedge Tricortical | 7770708 | Height=8mm |
| BIO Wedge Tricortical | 7770709 | Height=9mm |
| BIO Wedge Tricortical | 7770710 | Height=10mm |

*11-17mm Anterior-Posterior Depth, 12-15mm Medial-Lateral Width

## Iliac Crest

| Description | Reference # | Sizing |
|---|---|---|
| BIO Wedge Illiac Crest | 7770806 | Height=6mm |
| BIO Wedge Illiac Crest | 7770807 | Height=7mm |
| BIO Wedge Illiac Crest | 7770808 | Height=8mm |
| BIO Wedge Illiac Crest | 7770809 | Height=9mm |
| BIO Wedge Illiac Crest | 7770810 | Height=10mm |
| BIO Wedge Illiac Crest | 7770818 | Height=18mm |

*Minimum 25mm Anterior-Posterior Depth, Minimum 8mm Medial-Lateral Width

## BIO Shaft

| Femoral | | |
|---|---|---|
| Description | Reference # | Sizing |
| BIO Shaft Femoral | 77711060 | Length=60mm |
| BIO Shaft Femoral | 77711100 | Length=100mm |

*23-27mm Anterior-Posterior Diameter, 23-30mm Medial-Lateral Diameter

| Fibular | | |
|---|---|---|
| Description | Reference # | Sizing |
| BIO Shaft Fibular | 77712040 | Length=40mm |
| BIO Shaft Fibular | 77712060 | Length=60mm |
| BIO Shaft Fibular | 77712100 | Length=100mm |

*Minimum 8-15mm Diameter

## BIOExpand

| BIOExpand | | |
|---|---|---|
| Description | Reference # | Sizing |
| BIOExpand | 77040813 | 4x8x13 |
| BIOExpand | 77040816 | 4x8x16 |
| BIOExpand | 77040820 | 4x8x20 |
| BIOExpand | 77101013 | 10x10x13 |
| BIOExpand | 77101016 | 10x10x16 |
| BIOExpand | 77101020 | 10x10x20 |

# BIO Chips

## Cancellous (1-8mm)

| Description | Reference # | Sizing |
|---|---|---|
| BIO Chips Cancellous 5cc | 7770105 | 5cc 1-8mm particle range |
| BIO Chips Cancellous 15cc | 7770115 | 15cc 1-8mm particle range |
| BIO Chips Cancellous 30cc | 7770130 | 30cc 1-8mm particle range |
| BIO Chips Cancellous 60cc | 7770160 | 60cc 1-8mm particle range |

## Cancellous (1-4mm)

| Description | Reference # | Sizing |
|---|---|---|
| BIO Chips Cancellous 5cc | 7770205 | 5cc 1-4mm particle range |
| BIO Chips Cancellous 15cc | 7770215 | 15cc 1-4mm particle range |
| BIO Chips Cancellous 30cc | 7770230 | 30cc 1-4mm particle range |
| BIO Chips Cancellous 60cc | 7770260 | 60cc 1-4mm particle range |

## Cortico-Cancellous (1-8mm)

| Description | Reference # | Sizing |
|---|---|---|
| BIO Chips Cortico-Cancellous 30cc | 7770430 | 30cc 1-8mm particle range |
| BIO Chips Cortico-Cancellous 60cc | 7770460 | 60cc 1-8mm particle range |

## Cortico-Cancellous (1-4mm)

| Description | Reference # | Sizing |
|---|---|---|
| BIO Chips Cortico-Cancellous 30cc | 7770530 | 30cc 1-4mm particle range |
| BIO Chips Cortico-Cancellous 60cc | 7770560 | 60cc 1-4mm particle range |

## BIO DBM with Chips

| Description | Reference # | Sizing |
|---|---|---|
| Bio DBM with Chips 5cc | 7771305 | 5cc 1-8mm Cancellous with DBM Powder |
| Bio DBM with Chips 10cc | 7771310 | 10cc 1-8mm Cancellous with DBM Powder |
| Bio DBM with Chips 15cc | 7771315 | 15cc 1-8mm Cancellous with DBM Powder |

## AlloCraft PL

| Description | Reference # | Sizing |
|---|---|---|
| AlloCraft PL | 87008 | 8 x 22 H=8mm 5˚ Lordosis |
| AlloCraft PL | 87010 | 8 x 22 H=10mm 5˚ Lordosis |
| AlloCraft PL | 87012 | 8 x 22 H=12mm 5˚ Lordosis |
| AlloCraft PL | 87014 | 8 x 22 H=14mm 5˚ Lordosis |
| AlloCraft PL | 87016 | 8 x 22 H=16mm 5˚ Lordosis |

## AlloCraft TL

| Description | Reference # | Sizing |
|---|---|---|
| AlloCraft TL | 75008 | 8 x 26 H=8mm 0˚ Lordosis |
| AlloCraft TL | 75010 | 8 x 26 H=10mm 0˚ Lordosis |
| AlloCraft TL | 75012 | 8 x 26 H=12mm 0˚ Lordosis |
| AlloCraft TL | 75014 | 8 x 26 H=14mm 0˚ Lordosis |
| AlloCraft TL | 75016 | 8 x 26 H=16mm 0˚ Lordosis |

## Cervical Square Monolithic

| Description | Reference # | Sizing |
|---|---|---|
| AlloCraft CS | 6183-6-005 | H=5mm 0˚ Lordosis 14(w) x 12(d) |
| AlloCraft CS | 6183-6-006 | H=6mm 0˚ Lordosis 14(w) x 12(d) |
| AlloCraft CS | 6183-6-007 | H=7mm 0˚ Lordosis 14(w) x 12(d) |
| AlloCraft CS | 6183-6-008 | H=8mm 0˚ Lordosis 14(w) x 12(d) |
| AlloCraft CS | 6183-6-009 | H=9mm 0˚ Lordosis 14(w) x 12(d) |
| Inserter | 6183-0-902 | |

## AlloCraft CL

### Cervical Square Monolithic with Plug 4˚

| Description | Reference # | Sizing |
|---|---|---|
| AlloCraft CL | 6183-5-005 | H=5mm 5˚ Lordosis 14(w) x 12(d) |
| AlloCraft CL | 6183-5-006 | H=6mm 5˚ Lordosis 14(w) x 12(d) |
| AlloCraft CL | 6183-5-007 | H=7mm 5˚ Lordosis 14(w) x 12(d) |
| AlloCraft CL | 6183-5-008 | H=8mm 5˚ Lordosis 14(w) x 12(d) |
| AlloCraft CL | 6183-5-009 | H=9mm 5˚ Lordosis 14(w) x 12(d) |
| AlloCraft CL | 6183-5-010 | H=10mm 5˚ Lordosis 14(w) x 12(d) |

## AlloCraft CP

### Cervical Square Monolithic with Plug 0˚

| Description | Reference # | Sizing |
|---|---|---|
| AlloCraft CP | 6183-4-005 | H=5mm 0˚ Lordosis 14(w) x 12(d) |
| AlloCraft CP | 6183-4-006 | H=6mm 0˚ Lordosis 14(w) x 12(d) |
| AlloCraft CP | 6183-4-007 | H=7mm 0˚ Lordosis 14(w) x 12(d) |
| AlloCraft CP | 6183-4-008 | H=8mm 0˚ Lordosis 14(w) x 12(d) |
| AlloCraft CP | 6183-4-009 | H=9mm 0˚ Lordosis 14(w) x 12(d) |

## AlloCraft CA

### Cervical Assembled 5˚

| Description | Reference # | Sizing |
|---|---|---|
| AlloCraft CA | 6183-7-005 | H=5mm 5˚ Lordosis 14(w) x 11(d) |
| AlloCraft CA | 6183-7-006 | H=6mm 5˚ Lordosis 14(w) x 11(d) |
| AlloCraft CA | 6183-7-007 | H=7mm 5˚ Lordosis 14(w) x 11(d) |
| AlloCraft CA | 6183-7-008 | H=8mm 5˚ Lordosis 14(w) x 11(d) |
| AlloCraft CA | 6183-7-009 | H=9mm 5˚ Lordosis 14(w) x 11(d) |
| AlloCraft CA | 6183-7-010 | H=10mm 5˚ Lordosis 14(w) x 11(d) |

# Demineralized Bone Matrix

## DBM Solutions

### DBM

| Description | Reference # | Sizing |
|---|---|---|
| BIO DBM Putty | 7775001 | 1cc Vial |
| BIO DBM Putty | 7775025 | 2.5cc Vial |
| BIO DBM Putty | 7775005 | 5cc Vial |
| BIO DBM Putty | 7775010 | 10cc Vial |
| BIO DBM Gel | 7776001 | 1cc Syringe |
| BIO DBM Gel | 7776005 | 5cc Syringe |
| BIO DBM Gel | 7776010 | 10cc Syringe |
| BIO DBM Putty Plus | 7777005 | 5cc Vial |
| BIO DBM Putty Plus | 7777010 | 10cc Vial |

### BIO DBM Boat

| Description | Reference # | Sizing |
|---|---|---|
| BIO DBM Boat (Single) | 65305001 | Equiv 10cc Length=5cm |
| BIO DBM Boat (Short) | 653050 | Equiv 20cc Length=5cm |
| BIO DBM Boat (Long) | 653100 | Equiv 40cc Length=10cm |

### BIO DBM Shape

| Description | Reference # | Sizing |
|---|---|---|
| BIO DBM Shape 1cc | 65401 | Equiv 1cc |
| BIO DBM Shape 2.5cc | 65402 | Equiv 2.5cc |
| BIO DBM Shape 5cc | 65405 | Equiv 5cc |

# Viable Bone Matrix

## BIO4

| BIO4 | | |
|---|---|---|
| Description | Reference # | Sizing |
| BIO4 | PS51001 | 1cc |
| BIO4 | PS51002 | 2.5cc |
| BIO4 | PS51005 | 5cc |
| BIO4 | PS51001 | 10cc |

## Vitoss

| Vitoss | | |
|---|---|---|
| Description | Reference # | Sizing |
| Vitoss Foam Pack | 2102-1401 | Foam Pack 1.2cc |
| Vitoss Foam Pack | 2102-1402 | Foam Pack 2.5cc |
| Vitoss Foam Pack | 2102-1405 | Foam Pack 5cc |
| Vitoss Foam Pack | 2102-1410 | Foam Pack 10cc |
| Vitoss Foam Strip | 2102-1100 | Foam Strip 25 x 100 x 4mm 10cc |
| Vitoss Foam Strip | 2102-1101 | Foam Strip 25 x 240 x 4mm 24cc |
| Vitoss Foam Strip | 2102-1105 | Foam Strip 25 x 50 x 4mm 5cc |
| Vitoss Foam Strip | 2102-1110 | Foam Strip 25 x 50 x 8mm 10cc |
| Vitoss Foam Strip | 2102-1120 | Foam Strip 25 x 100 x 8mm 20cc |
| Vitoss Micro-Morsel Canister | 2102-0026 | Micro-Morsel Canister 5cc 1-2mm morsel range |
| Vitoss Micro-Morsel Canister | 2102-0027 | Micro-Morsel Canister 10cc 1-2mm morsel range |
| Vitoss Micro-Morsel Canister | 2102-0028 | Micro-Morsel Canister 15cc 1-2mm morsel range |
| Vitoss Micro-Morsel Canister | 2102-0029 | Micro-Morsel Canister 30cc 1-2mm morsel range |
| Vitoss Standard Morsel Canister | 2102-0030 | Standard Morsel Canister 5cc 1-4mm morsel range |
| Vitoss Standard Morsel Canister | 2102-0031 | Standard Morsel Canister 10cc 1-4mm morsel range |
| Vitoss Standard Morsel Canister | 2102-0032 | Standard Morsel Canister 15cc 1-4mm morsel range |
| Vitoss Standard Morsel Canister | 2102-0033 | Standard Morsel Canister 30cc 1-4mm morsel range |
| Vitoss Macro-Morsels | 2102-0020 | Macro-Morsels 15cc 4-7mm morsel range |
| Vitoss Macro-Morsels | 2102-0021 | Macro-Morsels 30cc 4-7mm morsel range |
| Vitoss Block | 2102-0013 | Block 1.2cc |
| Vitoss Block | 2102-0006 | Block 10cc |
| Vitoss Macro Morsel Tower | 2102-0131 | Macro Morsel Tower 30 cc (10 pack) |

# Vitoss BA, BA2X, BiModal

## Vitoss BA

| Description | Reference # | Sizing |
|---|---|---|
| Vitoss BA Bioactive Foam Pack | 2102-1601 | Bioactive Foam Pack 1.2cc |
| Vitoss BA Bioactive Foam Pack | 2102-1602 | Bioactive Foam Pack 2.5cc |
| Vitoss BA Bioactive Foam Pack | 2102-1605 | Bioactive Foam Pack 5cc |
| Vitoss BA Bioactive Foam Pack | 2102-1610 | Bioactive Foam Pack 10cc |
| Vitoss BA Bioactive Foam Strip | 2102-1500 | Bioactive Foam Strip 25 x 100 x 4mm 10cc |
| Vitoss BA Bioactive Foam Strip | 2102-1505 | Bioactive Foam Strip 25 x 50 x 4mm 5cc |
| Vitoss BA Bioactive Foam Strip | 2102-1510 | Bioactive Foam Strip 25 x 50 x 8mm 10cc |
| Vitoss BA Bioactive Foam Strip | 2102-1520 | Bioactive Foam Strip 25 x 100 x 8mm 20cc |

## Vitoss BA2X

| Description | Reference # | Sizing |
|---|---|---|
| Vitoss BA 2X Bioactive Foam Pack | 2102-2101 | Bioactive Foam Pack 1.2cc |
| Vitoss BA 2X Bioactive Foam Pack | 2102-2102 | Bioactive Foam Pack 2.5cc |
| Vitoss BA 2X Bioactive Foam Pack | 2102-2105 | Bioactive Foam Pack 5cc |
| Vitoss BA 2X Bioactive Foam Pack | 2102-2110 | Bioactive Foam Pack 10cc |

## Vitoss BiModal

| Description | Reference # | Sizing |
|---|---|---|
| Vitoss BA BiModal Foam Pack | 2102-1901 | Bioactive Foam Pack 1.2cc |
| Vitoss BA BiModal Foam Pack | 2102-1902 | Bioactive Foam Pack 2.5cc |
| Vitoss BA BiModal Foam Pack | 2102-1905 | Bioactive Foam Pack 5cc |
| Vitoss BA BiModal Foam Pack | 2102-1910 | Bioactive Foam Pack 10cc |

# Bone Marrow Aspiration and Delivery

## Imbibe Bone Marrow Aspiration and Delivery System

| Imbibe Needle | | |
|---|---|---|
| Description | Reference # | Sizing |
| Beveled Needle | 2090-9051 | 11 gauge x 6 inch |
| Beveled Needle | 2090-9052 | 8 gauge x 6 inch |
| Beveled Fenestrated Needle | 2090-9053 | 8 gauge x 6 inch |
| Diamond Tip Needle | 2090-9027 | 11 gauge x 4 inch |
| Diamond Tip Needle | 2090-9028 | 11 gauge x 6 inch |
| Diamond Tip Needle | 2090-9029 | 8 gauge x 6 inch |
| Diamond Tip Fenestrated Needle | 2090-9030 | 8 gauge x 6 inch |
| Diamond Tip Needle | 2090-9047 | 8 gauge x 8 inch |
| Imbibe Syringe | 2105-0010 | Syringe 10cc |
| Imbibe Syringe | 2105-0020 | Syringe 20cc |
| Imbibe Syringe | 2105-0030 | Syringe 30cc |

# Stryker Comprehensive Biologic

## Spine

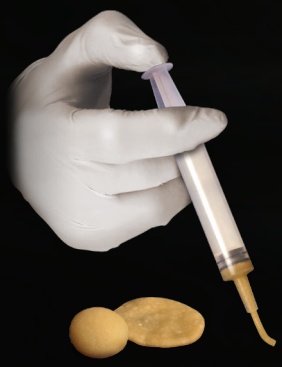

BIO$^4$

DBM


Vitoss

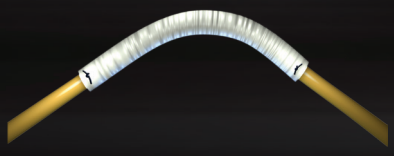
AVS Closed

## Trauma and Extremities



DBM

Hydroset



Neuroflex

# s Portfolio

## Craniomaxillofacial

Demineralized Cancellous Cube

Demineralized Cancellous Fillers

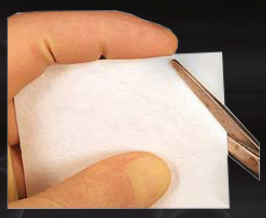
Demineralized Cancellous Sponge Ship


DirectInject HA Cement

Demineralized Cancellous Particulate

## Sports Medicine

Allogratts



Soft Tissue Repair

Autologous Platelet Rich Plasma

Acellular Dermis

# Endnotes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**Vitoss Indications for Use**
Vitoss Bone Graft Substitute is intended for use as a bone void filler for voids or gaps that are not intrinsic to the stability of the bony structure. Vitoss Bone Graft Substitute is indicated for use in the treatment of surgically created osseous defects or osseous defects created from traumatic injury to the bone.

Vitoss Bone Graft Substitute is intended to be used for filling bony voids or gaps of the skeletal system (i.e., the extremities, pelvis and posterolateral spine) and may be combined with autogenous blood and/or bone marrow. Following placement in the bony void or gap, the scaffold resorbs and is replaced with bone during the healing process.

**Vitoss Contraindications**
Use of Vitoss Bone Graft Substitute is contraindicated in the presence of one or more of the following clinical situations: Growth plate fractures, segmental defects, conditions where the surgical site may be subjected to excessive impact or stresses, including those beyond the load strength of fixation hardware, significant vascular impairment proximal to the graft site, metabolic or systemic bone disorders that affect bone or wound healing, infected sites, osteomyelitis at the operative site, defect site stabilization is not possible, intraoperative soft tissue coverage is not planned or possible, in direct contact with the articular space, conditions in which general bone grafting is not advisable.

Vitoss Foam, Vitoss BA, Vitoss BA2X, and Vitoss BiModal Foam Bone Graft Substitutes must not be used in patients with a history of anaphylaxis, history of multiple allergies, known allergies to bovine collagen, or who are being treated for desensitization to meat products because this product contains bovine collagen.

**Imbibe Needle Indications for Use**
The Imbibe Needle is for use in aspirating bone marrow or autologous blood by use of a syringe. The bone marrow or autologous blood may be combined with bone graft or bone void filler. The Imbibe Needle is also for use in the placement of guidewires (e.g. kwires) during orthopedic surgery.

**Imbibe Needle Contraindications**
Intended for use only by a licensed physician. The physician should be familiar with contraindications of performing a bone marrow aspiration procedure. Physician's judgment is required to consider patient's risk factors such as anticoagulant therapy or clotting disorders, prior to aspirating bone marrow.

**Imbibe Syringe Indications for Use:**
The Imbibe Bone Marrow Aspiration Syringe is intended for use as a piston syringe for the aspiration of bone marrow, autologous blood, plasma or other blood components. Prior to use, the syringe can be filled with the surgeon's choice of bone void filler (allograft, autograft, or synthetic bone graft material).
This syringe provides the surgeon with a convenient way to mix autologous blood or bone marrow with bone void filler (bone graft) and deliver the material to the orthopaedic surgical site.

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