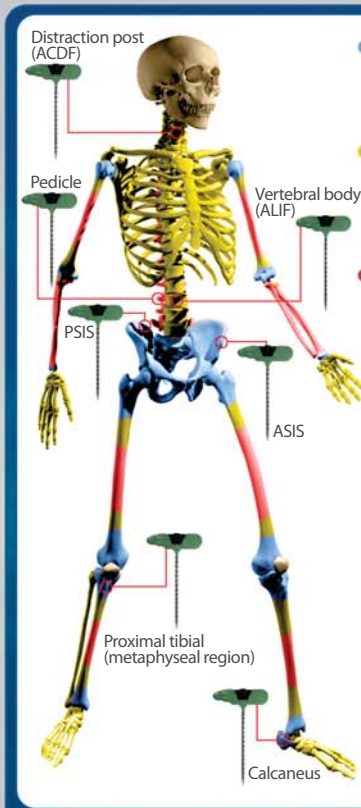


Bone Marrow: A validated biologic driver for bone regeneration

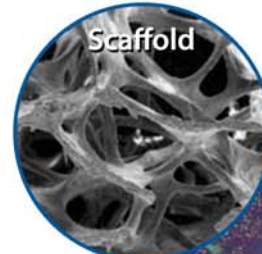


- **Metaphyseal / Cancellous Zones**
These locations contain marrow rich cancellous bone.
VITOSS may be used alone.
- **Transitional Zones**
These locations contain some marrow and some cancellous bone.
Use VITOSS + BMA for the best results, but VITOSS may be enough by itself.
- **Diaphyseal Zones**
These locations are marrow poor regions; typically mid-shaft and long bone locations.
Use VITOSS + BMA for the best results.

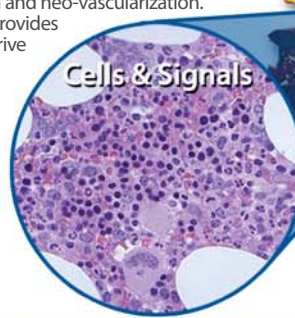
ACDF - Anterior Cervical Discectomy and Fusion
ALIF - Anterior Lumbar Interbody Fusion
ASIS - Anterior Superior Iliac Spine
PSIS - Posterior Superior Iliac Spine

Why is ICBG 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.



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



Bone marrow is a powerful biologic driver found in iliac crest autograft.

There are over 175 references supporting the use of bone marrow for grafting.¹

Less / No Morbidity

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.

Percutaneous BMA injection stimulates healing in tibial non-unions

Percutaneous bone marrow injection united 8 of 10 tibial non-unions with cast immobilization and 10 of 10 non-unions with intramedullary nails.

"Bone marrow injection was as effective as past open autologous grafting but with considerably fewer disadvantages."³

BMA enhances fusion over ICBG alone

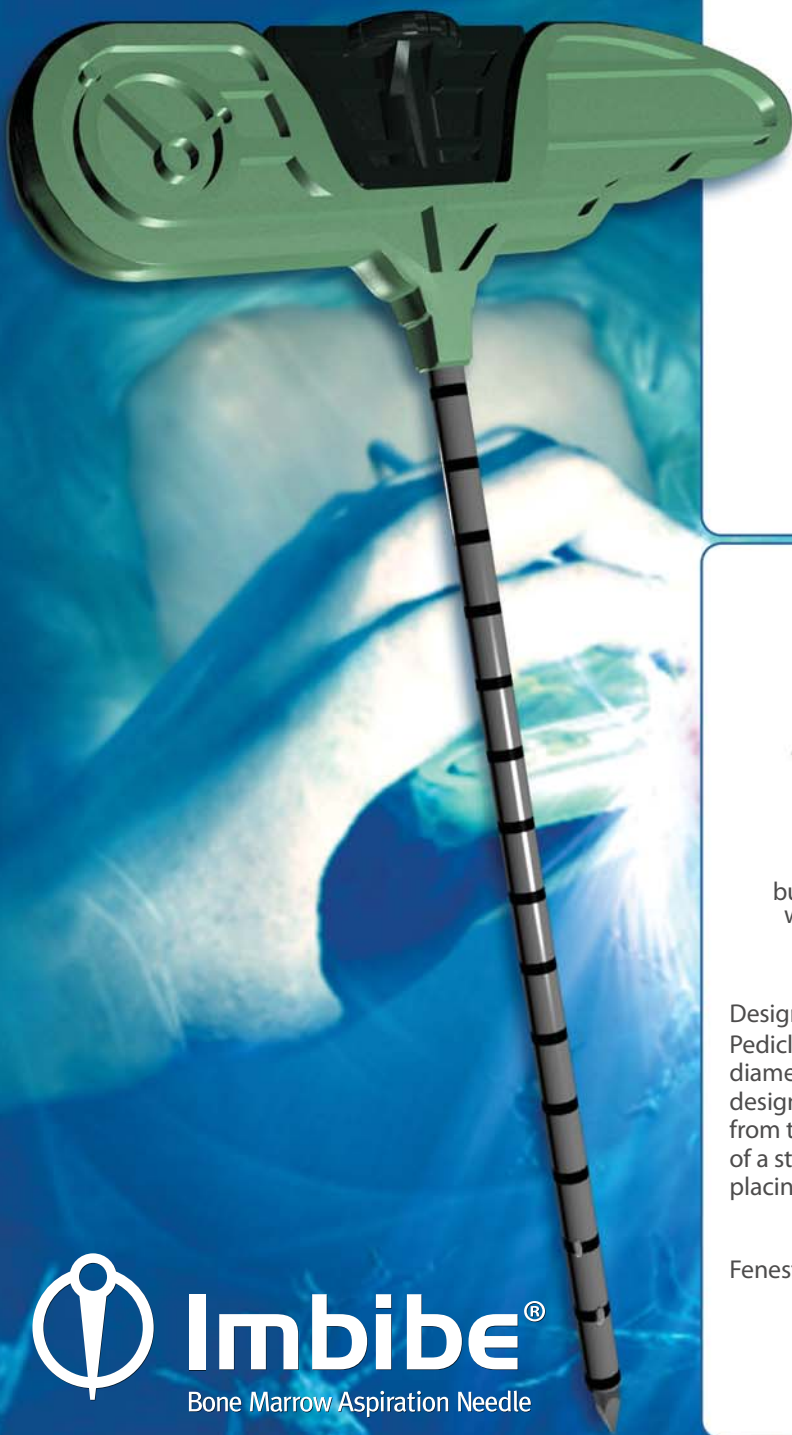
A pre-clinical evaluation (posterolateral fusion study) showed 61% fusion in ICBG + BMA versus 25% fusion in ICBG + blood at 12 weeks.

BMA enhances graft incorporation

"The addition of autologous marrow is a cheap and highly effective way of achieving graft incorporation."⁵
90% incorporation of graft with BMA was achieved during impaction grafting versus 40% for controls (historical).

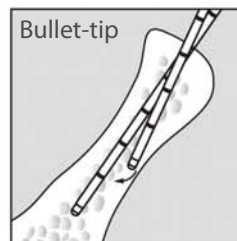
"Iliac marrow is useful as a bone grafting material to enhance the biological formation in porous coated implants."⁶
There was a statistically significant decrease in radioluscent lines on x-rays of knees grafted with marrow versus those without.

Imbibe - Advanced Bullet-Tip Needle Design



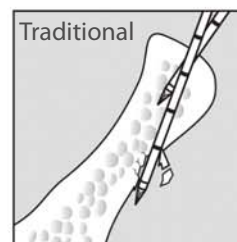
Bullet-tip design

Bullet-tip BMA needle is designed to navigate within cortical bone boundaries. The rounded, bullet-tip design tends to deflect back into cancellous bone marrow spaces.



Traditional needles

Sharp-tip needle may perforate cortical bone boundaries making BMA harvest impossible and increasing the risk of soft tissue damage.



Bullet-tip

Trocar

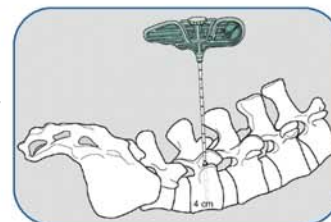
Color coded stylets to quickly and easily identify sharp vs. bullet-tip design



Green stylet
bullet-tip stylet for navigation within the cancellous bone marrow spaces

Black stylet
sharp-tip stylet for penetrating cortical bone

Designed for pedicle aspiration
Pedicle aspiration 8 gauge (4.2mm diameter) bullet-tip needle was designed to easily aspirate marrow from the pedicle following the use of a standard "gearshift" prior to placing pedicle screws.



Fenestrations



Oval-shaped ports (6) located within 20mm of needle tip