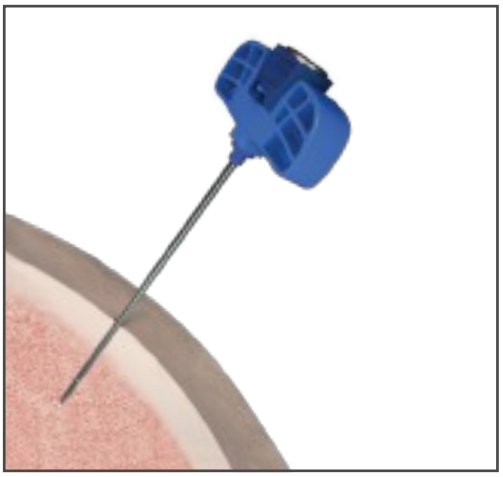
Arthrex Angel™ System

Bone Marrow Concentration

Indication-specific PRP and PRF gel preparations from bone marrow aspirate



ARTHREX angel™ SYSTEM

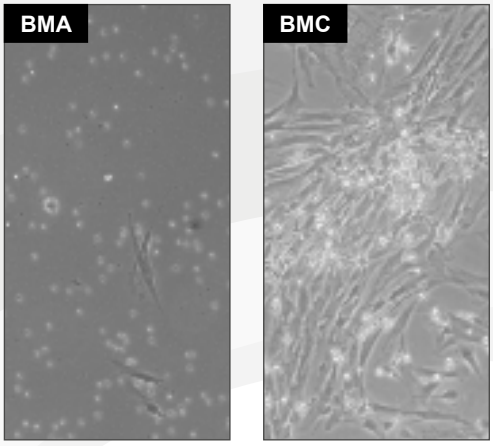
Arthrex®

Bone Marrow Concentration

Bone marrow contains nucleated and progenitor cells such as hematopoetic and mesenchymal stem cells. The Arthrex® Angel BMC Kit (ABS-10072) for Arthrex Angel™ System is a convenient and rapid means of concentrating the cellular contents and growth factors in bone marrow aspirate: *

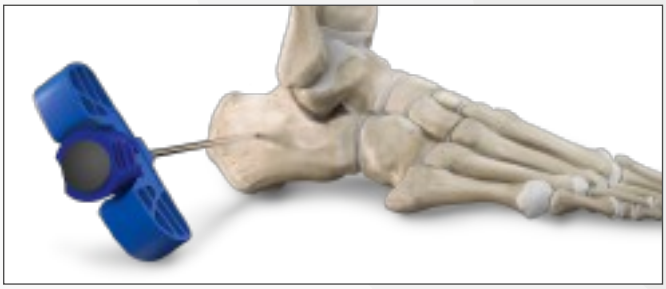
	Platelet Concentration (K/µl)	Nucleated Cell Concentration (K/µl)	Hematopoetic Cell Concentration (K/µl)	Total Neutrophil ($x10^6$)
BMA	87.7 ± 6.4	24.5 ± 15.6	0.002 ± 0.001	612.1
BMC	787.0 ± 317.6	240.5 ± 186.6	0.081 ± 0.056	132.9
Increase Above Baseline	~9x	~10x	~33x	↓80%

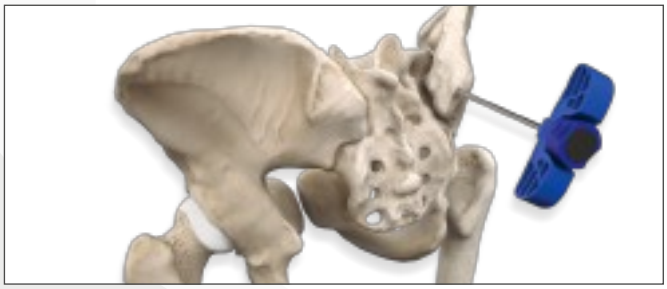
** These values are averages, which may differ in some cases. Starting volume was always 60 ml anticoagulated BMA from iliac crest, HCT 7 %. The average volume was 1.8 ml of BMC.*



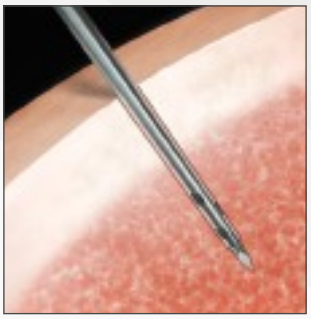
CFUs after 96 h of incubation time

Harvesting

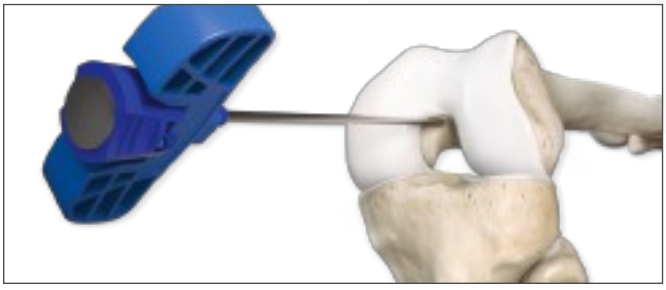


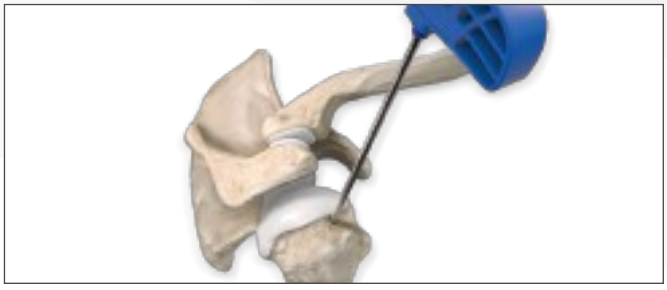


Calcaneus Harvest Technique
Make a small incision 1 cm anterior and 1 cm plantar to the insertion of the Achilles tendon over the lateral portion of the calcaneus, taking care to avoid the sural nerve. When inserting the needle do not exceed a depth of 3 cm. Aspirate a small volume of bone marrow redirecting as necessary until the desired volume of BMA is obtained.



Posterior Iliac Crest Harvest Technique
Make a small incision at the desired location over the PSIS of the iliac crest. Use the needle tip to locate the center of the iliac crest. Insert the needle and advance 3 cm. Aspirate the bone marrow slowly, redirecting as necessary. Repeat until the desired volume is obtained.



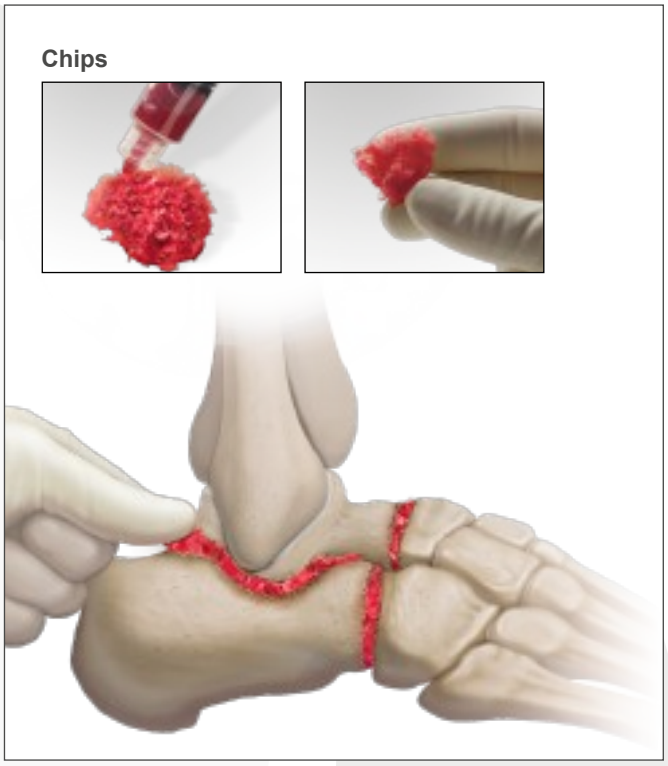


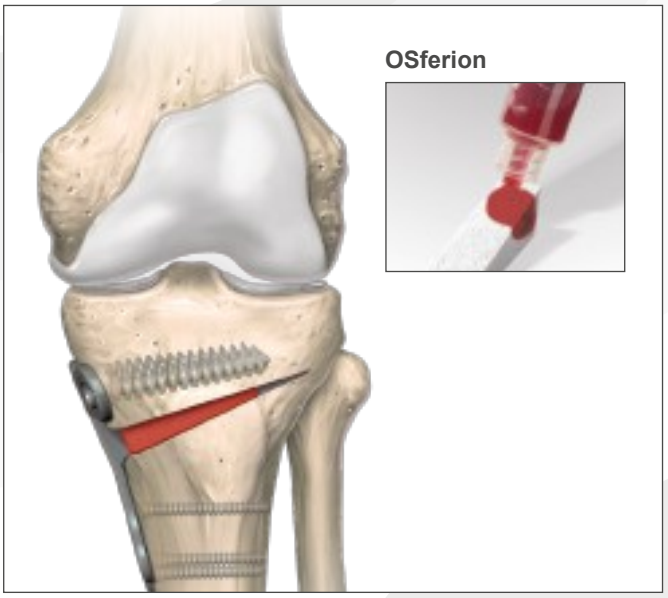
Arthroscopic Distal Femur Harvest Technique
Bone marrow aspiration should occur before drilling tunnels. Arthroscopically insert the needle in the apex of the femoral notch to a depth of 3 cm. Turn off the arthroscopic fluid before removing the trocar and attaching the syringe. Slowly aspirate the bone marrow. In order to obtain the desired volume it may be necessary to rotate 90° or withdraw the needle 0.5 cm when aspirating; prevent withdrawing the needle past the 2 cm mark.

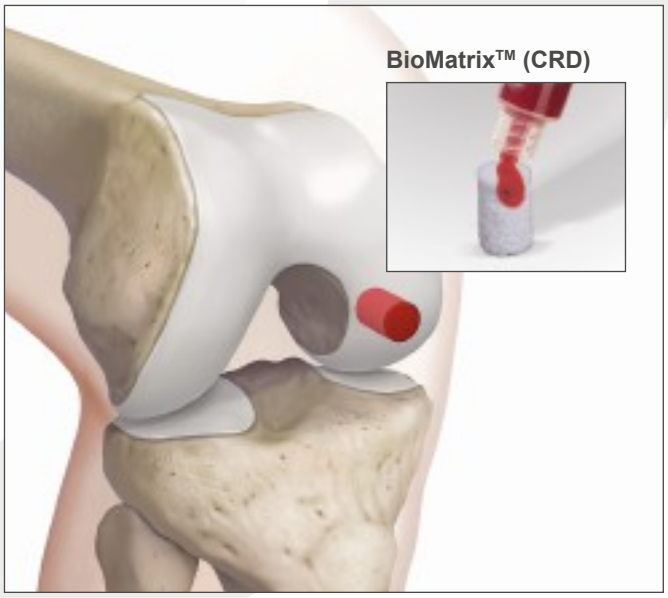
Arthroscopic Proximal Humerus Harvest Technique
Bone marrow aspiration should occur before any fixation implants are inserted. Arthroscopically insert the needle in the location where the first anchor would be placed; do not exceed a depth of 3 cm. Turn off the arthroscopic fluid before removing the trocar and attaching the syringe. Aspirate the bone marrow slowly. In order to obtain the desired volume it may be necessary to rotate 90°or withdraw the needle 0.5 cm when aspirating; prevent withdrawing the needle past the 2 cm mark.

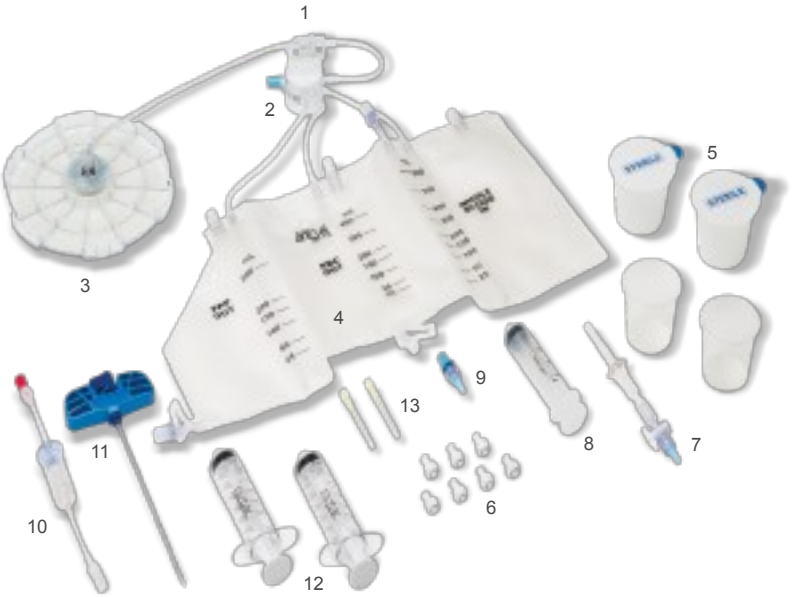
Applications

Concentrated bone marrow aspirate is a bioactive fluid that supports the ingrowth and resorption of a variety of biocompatible and resorbable scaffolds.[1, 2, 3, 4] Autograft and allograft but also synthetic material can be mixed with concentrated bone marrow aspirate prior to application to an orthopaedic site:









Arthrex® Angel BMC-Kit

1 Platelet Cuvette
2 Rotating Valve
3 Variable Volume Separation Chamber
4 Three-Compartment Reservoir Bag
5 60 ml Wrapped Specimen Cup
6 Male-Female Luer Lock Plugs
7 Whole Blood Spike Adapter
8 20 ml Luer Lock Syringe
9 Syringe-Activated PRP Valve
10 BMA Clot Filter
11 Fenestrated Bone Marrow Needle
12 Vac Lok Syringe, 30 ml
13 Hypodermic Needle, 20G

Ordering Information

Arthrex Angel™-System	ABS-10066
Arthrex® Angel BMC Kit with Bone Marrow Needle	ABS-10072
ACD-A (20 ml)	SAAV222.G00

References:

1. *Orii H, Sotome S, Chen J, et al. Beta-tricalcium phosphate (beta-TCP) graft combined with bone marrow stromal cells (MSCs) for posterolateral spine fusion. J Med Dent Sci 2005;52:51-7.*
2. *Kai T, Shao-qing G, Geng-ting D. In vivo evaluation of bone marrow stromal-derived osteoblasts-porous calcium phosphate ceramic composites as bone graft substitute for lumbar intervertebral spinal fusion. Spine 2003;28:1653-8.*
3. *Betsch M, Schneppendahl J, Thuns S, et al. Bone Marrow Aspiration Concentrate and Platelet Rich Plasma for Osteochondral Repair in a Porcine Osteochondral Defect Model. PLoS ONE 2013; 8(8): e71602.*
4. *Shih H, Shih L, Sung T, Chang Y. Restoration of bone defect and enhancement of bone ingrowth using partially demineralized bone matrix and marrow stromal cells. Journal of Orthopaedic Research 2005; 23(6): 1293-9.*

Arthrex®

www.arthrex.com

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