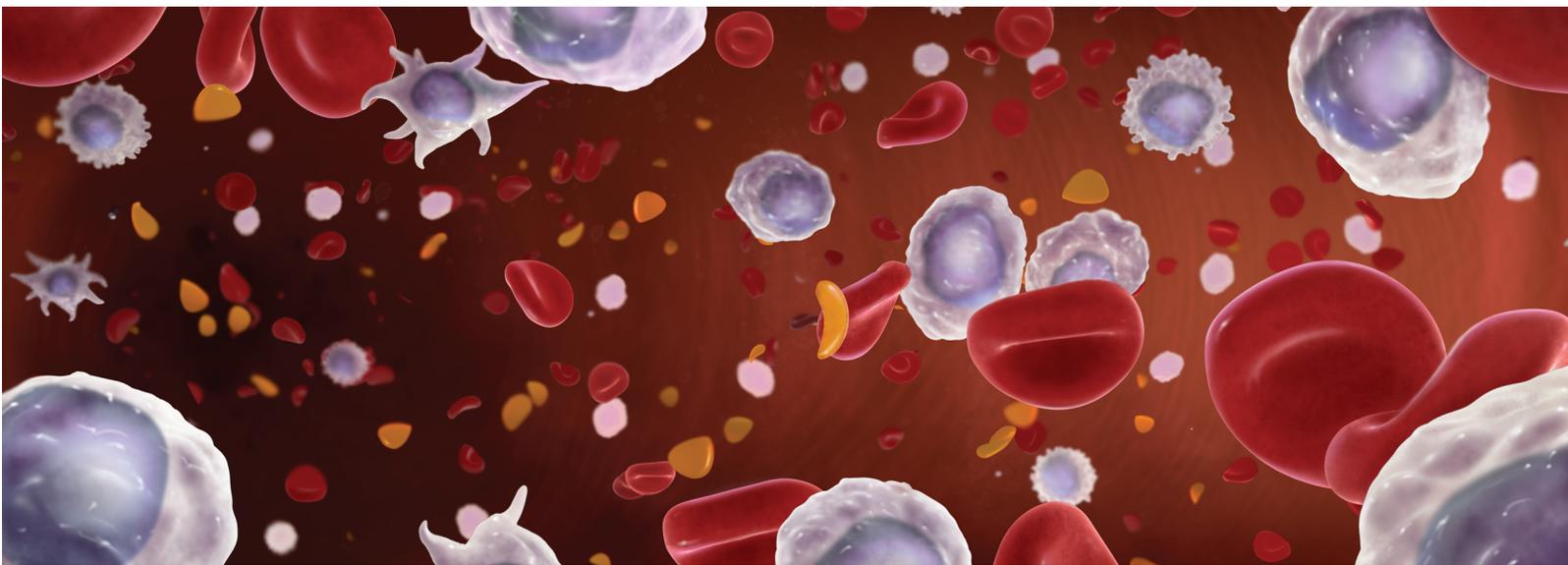




Bone Marrow Concentration



***For customized cellular concentrations
of platelet-rich plasma from bone
marrow aspirate***



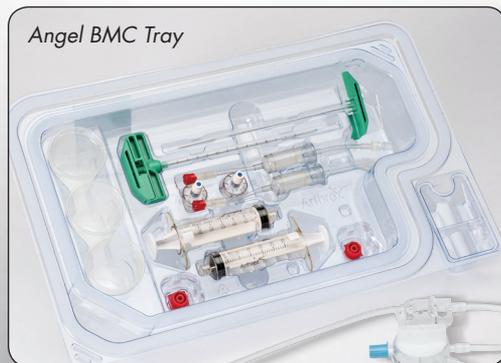
Arthrex®

Arthrex Angel System™

Technology is what sets Angel apart from the competition. Angel utilizes a proprietary platelet sensor and one-button automation to prepare customized platelet-rich plasma formulations. Angel is the only PRP device that can deliver platelet concentrations up to 18x baseline, with adjustable leukocyte concentrations.

Features and Benefits:

- Proprietary platelet sensor system
- Adjustable platelet concentrations
- Adjustable WBC concentrations
- Flexible processing volume 40-180 ml
- Each processing kit can process three cycles up to 180 ml, on the same patient
- Programmable – can store up to thirty custom processing protocols
- Closed system, delivers PRP, PPP and RBCs into separate, sterile compartments



Angel BMC Tray

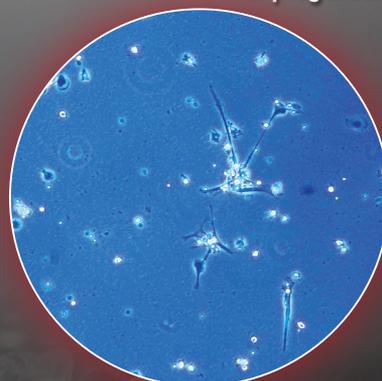


In Vitro culture expansion of progenitor cells over 96 hours

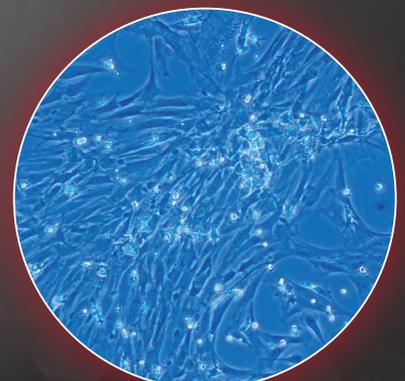


Angel Powered BMC Kit

Arrow® OnControl® System Sterile Procedure Tray



48 hrs.



96 hrs.

Precision Separation

Advantages of 3-Sensor Technology (3ST):

- No syringe switching
- No manual steps to prepare PRP
- Delivers PRP, PPP and RBCs into separate, sterile compartments
- Ability to modulate platelet, leukocyte and RBC content
- Consistent PRP output

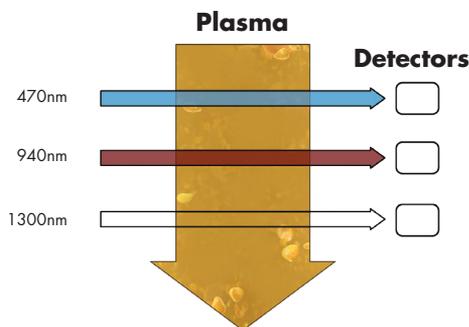
High-specificity 3ST light sensor technology and automated valve actuation are the foundation of the Angel System. The results of these features are the production of a high yield of PRP and PPP from whole blood.

3-Sensor Technology

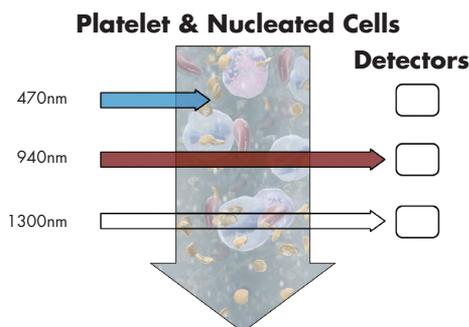
Angel incorporates three sensors to accurately separate blood components using cell-specific wavelengths of light to increase cellular yields. Absorption of 470nm light detects platelets and leukocytes, 940nm detects erythrocytes and the 1300nm wavelength corrects for ambient light and the presence of air bubbles.



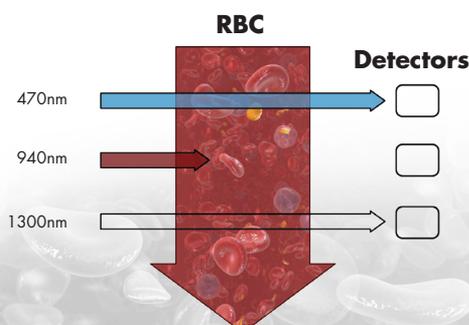
High-specificity 3ST light sensor technology



When plasma is present, all three light beams pass through and contact the detector. The Angel device recognizes the presence of plasma and turns the valve to collect Platelet-Poor Plasma (PPP). The PPP is deposited in the PPP collection reservoir.



When platelets and nucleated cells are present, the 470nm wavelength of light is absorbed. The absence of the 470nm beam on the detector alerts the Angel to stop collecting PPP. The Angel will then actuate the valve to collect PRP. The PRP is directed into the collection syringe on top of the unit.

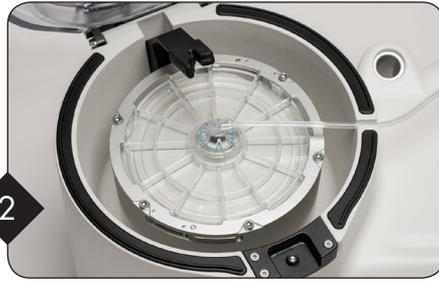


The 940nm wavelength is absorbed by red blood cells (RBCs). When the detector no longer detects the 940nm beam, the Angel will allow a percentage of RBCs to pass through into the PRP collection syringe. The percentage of RBCs collected in the PRP syringe is determined by the Hematocrit (HCT) setting selected by the operator.

Instructions For Use



1 Remove the Angel Processing Set from the tray and place it on top of the machine.



2 Insert the variable volume separation chamber into the centrifuge adapter by aligning the notches.



3 Once aligned, press down and turn clockwise until the position indicators snap into place. Place the tube leading from the separation chamber through the centrifuge well slot.



4 Lower the centrifuge stator arm and align it with the raised tab on top of the separation chamber. Close the centrifuge lid.



5 Place the pump loop tubing over the pump rotor. The pump loop will automatically load when the processing cycle is initiated.



6 Press down firmly on the backside of the platelet cuvette until the assembly is snapped in place. *Note: It is essential that the platelet cuvette/valve assembly seats fully on the machine to obtain proper sensing of blood components.*



7 Hang the three-compartment reservoir bag on the two support pins located on the side of the Angel System.



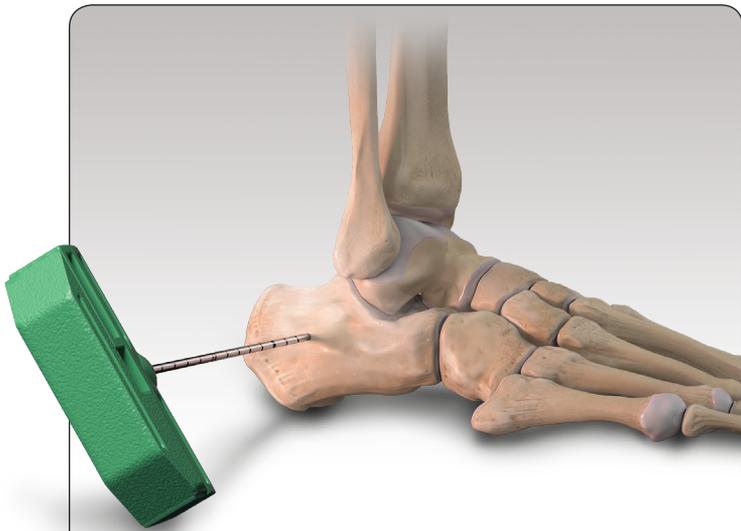
8 Prepare the heparin flush. Dilute 5,000 units of heparin (1,000 units/ml) with 5 ml of sterile saline to achieve a final concentration of 500 units per ml. Transfer heparin flush to sterile field. Transfer ACD-A solution to the sterile field. Each 60 ml syringe will contain 8 ml ACD-A, 30 ml syringes will contain 4 ml of ACD-A and 20 ml syringes require 3 ml of ACD-A.



9 At the sterile field, draw up the heparin flush in the first 30 cc collection syringe. Flush the bone marrow harvest needle. Return the remaining heparin flush solution to the medicine cup. Draw up 4 ml of ACD-A solution into the first 30 cc collection syringe and cap.

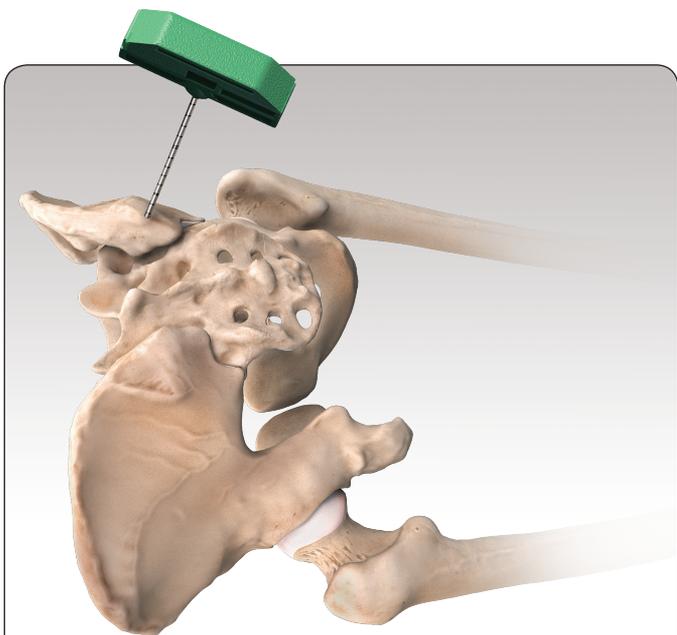
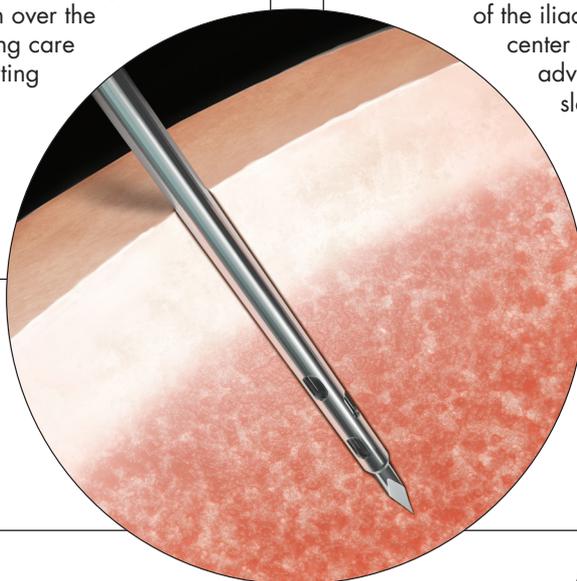


10 At the sterile field, utilize the second 30 cc collection syringe to draw up the remaining heparin solution. Flush the bone marrow processing filter. Discharge the remaining heparin solution. Draw up 4 ml of ACD-A solution into the second 30 cc collection syringe and cap.



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.

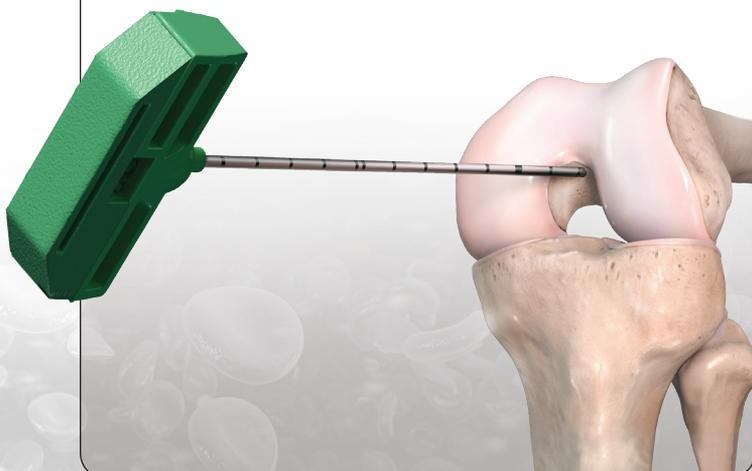


Posterior Iliac Crest Harvest Technique

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.

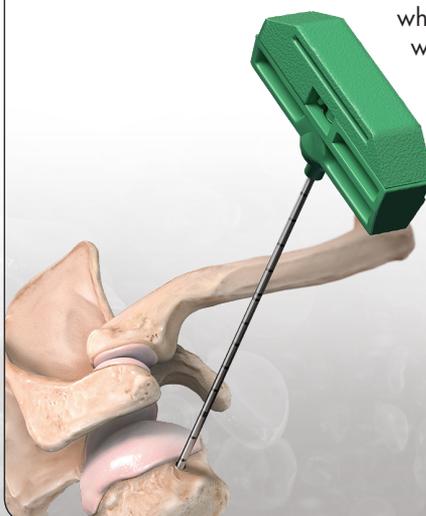
Arthroscopic Distal Femur Harvest Technique

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

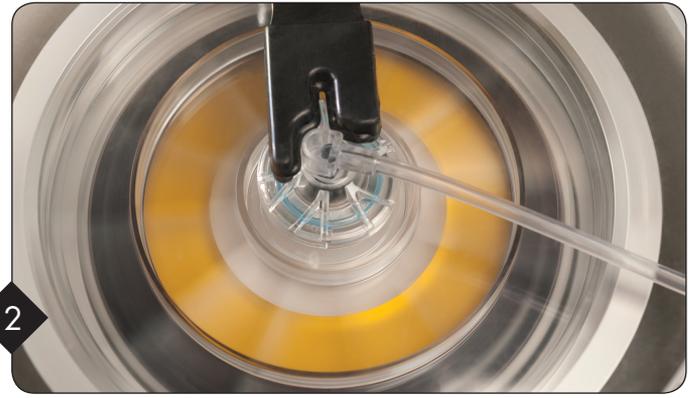
Bone marrow aspiration should occur before any fixation implants are inserted. Arthroscopically insert the needle in the location where the first anchor would be placed; do not exceed a depth of 3 cm. Turn off the arthroscopic fluid before removing the trocar and attaching the syringe. Aspirate the bone 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.



Angel Processing



1 After the Angel system has been assembled and the operator has connected the heparin-flushed bone marrow filter to the "whole blood in" compartment, the citrated bone marrow aspirate may be introduced. The ratio of citrate anticoagulant to whole blood, bone marrow aspirate or a mixture of both is 1:7.



2 The Angel can process 40-180 ml of whole blood, bone marrow aspirate or a mixture of both in a single cycle. The approximate spin time for 40 ml sample is 15 minutes. The spin time for a 180 ml of sample is 26 minutes.



3 PRP collection is automated. No manual steps are required for preparation and there are no syringes to change, buffy coats to resuspend or plasma to decant. The automated process is driven by the 3-sensor technology employed by the Angel centrifuge.



4 The first component to be collected is platelet-poor plasma. The Angel will stop collecting PPP when the 470nm wavelength of light is absorbed by platelets. The Angel will adjust the valve position to collect PRP until red blood cells are detected by the absorption of the 940nm wavelength of light.



5 The PRP will be dispensed into the PRP collection syringe after the PPP is collected. To increase the volume of the PRP syringe by diluting with PPP, simply pull back on the plunger of the syringe. If platelet-poor plasma is desired, it may be withdrawn from the port on the PPP compartment.

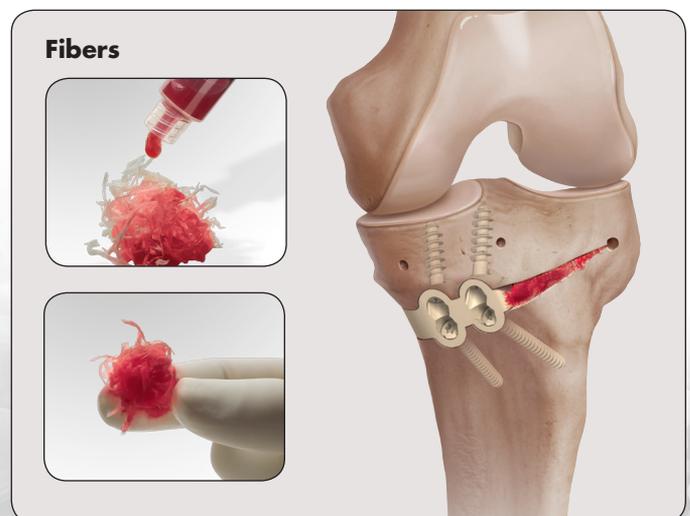
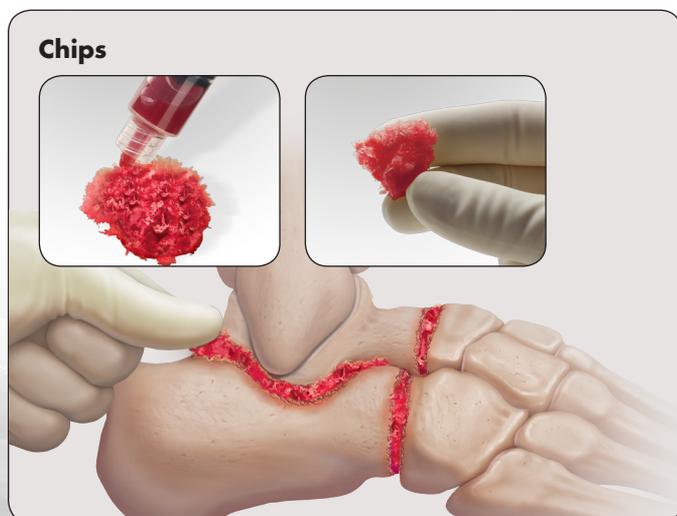
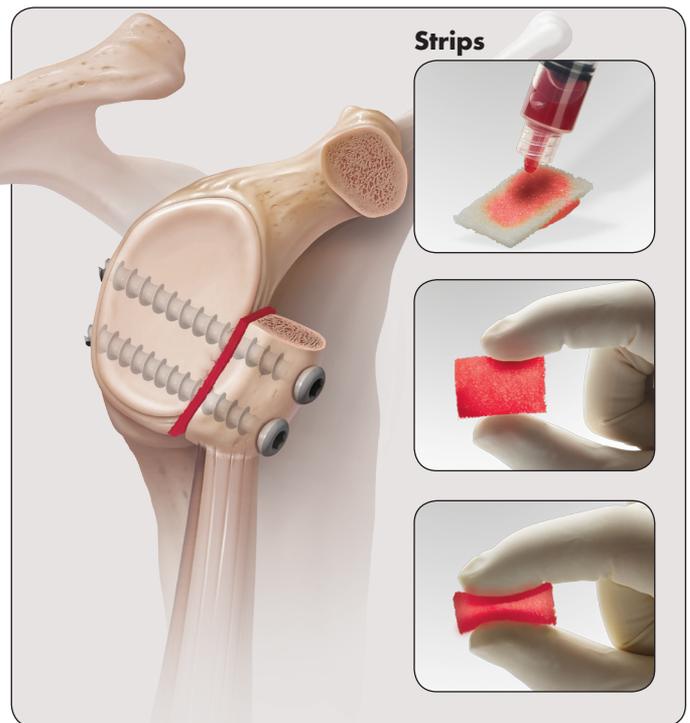
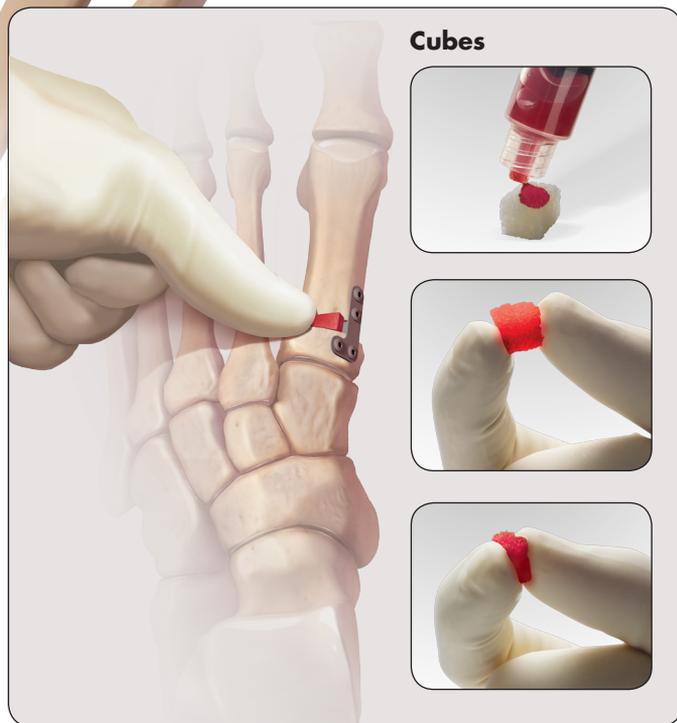


6 The Angel can process up to 180 ml in one cycle or a total of three cycles for the same patient with the same disposable. *Note: If bone marrow aspirate and peripheral blood will be processed separately, it is recommended that peripheral blood be processed first.*

Arthrex Angel System™

Allograft demineralized bone (DBM) is optimal for combination with autologous, biologically-active products. DBM putty, sponges and cortical fibers provide a grafting material with excellent handling characteristics when hydrated with a bioactive fluid such as concentrated bone marrow aspirate. Hydrated DBM provides a scaffold that is rich in growth factors, natural architecture and interconnected porosity.

The Angel Bone Marrow Processing Kits are a convenient and rapid means of concentrating the cellular contents and growth factors contained in bone marrow aspirate.



Ordering Information

Item Description

Arthrex Angel System™	ABS-10060
Arthrex Angel System, Refurbished	ABS-10060R
Angel BMC Kit	ABS-10062
Angel BMC Tray	ABS-10062T
Angel Powered BMC Kit	ABS-10062D
Adipose Tissue Harvesting Kit	ABS-10055
Arrow® OnControl® Power Driver w/Cradle	9401
Arrow OnControl System Sterile Procedure Tray	9403-VC-006
Arthrex Biologics Cart	ABS-10010
BioXpress™ Graft Delivery Device, 10 cm, Blunt Tip	ABS-10053-10
BioXpress Graft Delivery Device, 15 cm, Blunt Tip	ABS-10053-15
BioXpress Graft Delivery Device, 10 cm, Angled Tip	ABS-10053-10-45
BioXpress Graft Delivery Device, 15 cm, Angled Tip	ABS-10053-15-45
Viscous-Gel, High Viscosity	ABS-10050
Viscous-Spray, Low Viscosity	ABS-10051
Viscous-Spray II, Low Viscosity	ABS-10052
Fenestrated Delivery Needle	ABS-20000
Tuohy Delivery Needle	ABS-21000
Cannula Bending Tool	AR-6650

*To order please call Arthrex, Inc. at 1-800-933-7001
Contact your local Arthrex Representative for additional information*

Indications for Use: To be used in the clinical laboratory or intraoperatively at the point of care for the safe and rapid preparation of platelet-poor plasma and platelet concentrate (platelet-rich plasma) from a small sample of whole blood or a small mixture of blood and bone marrow. The platelet-rich plasma can be mixed with autograft and/or allograft bone prior to application to an orthopaedic site.

Caution: Federal law (USA) restricts this device to sale by or on the order of a physician.



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