FLOWER™ ORTHOPEDICS

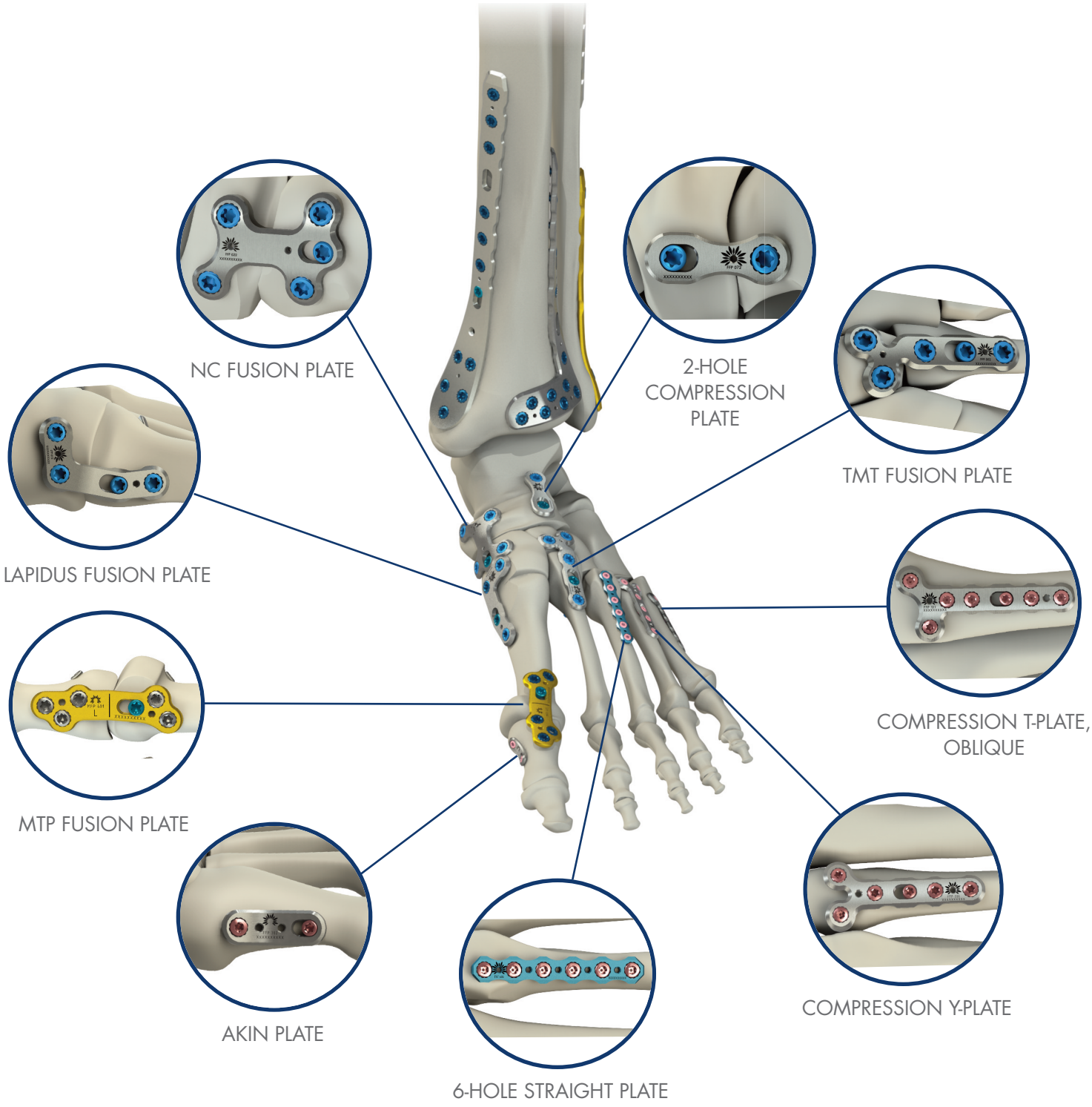
STANDARDS FOR ORTHOPEDICS

The Flower Medial Column Fusion Plate

PROCEDURE GUIDE

www.flowerortho.com

The Flower Foot & Ankle Application

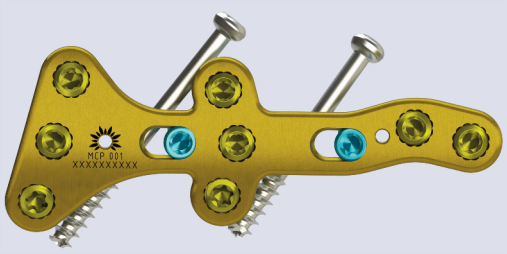


INDICATIONS FOR USE:

The Flower Small and Medium Implants set is intended for use for internal fixation of fractures and reconstruction of bones, including the scapula, olecranon, humerus, radius, ulna, pelvis, distal tibia, fibula, hand and foot in adults and for use in long bones in adolescents (12-21) in whom the growth plates have fused. Examples of these internal fixations and reconstructions include compression fractures, intra-articular and extra-articular fractures, displaced fractures, osteotomies, non-unions and mal-unions. This system can be used for palmar, ventral, dorsal and orthogonal application.

The Flower Orthopedics Bone Screw set is intended to be used for the fixation of bone structures, fusion of joints of bone reconstruction.

The Flower Medial Column Fusion Plate – Product Rationale

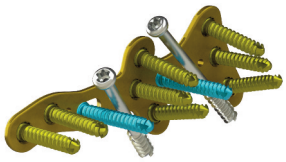
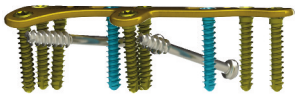


The Flower Medial Column Plate Fusion Plate creates a robust construct for flatfoot reconstructions, anatomically contoured to best fit patient anatomy and accommodate the NC and first TMT joints.

The Flower Medial Column Plate is recommended to be used in combination with 4.0mm cannulated partially threaded screws across each joint to maximize compression and produce the most stable construct. Plating screws uniquely are positioned to avoid the interfragmentary screws.

Screw holes are positioned to maximize bone purchase while avoiding vital structures and providing market-leading fixation in the Flower Medial Column Fusion Plate. Each joint can be individually compressed, improving anatomic alignment.

The Flower Medial Column Fusion Plate – Design Features

	CONSTRUCT FEATURES	SURGICAL BENEFIT
	Anatomically Based Fixation	Screws are targeted to areas of greatest bone purchase, and avoid adjacent structures
	Anatomic Plate Design	Plate positioning on bone facilitates faster and better anatomic alignment, as well as varied patient anatomy
	Segmental Compression	Each joint is compressed independently through the compression slots, providing enhanced likelihood for fusion
	Plate accepts 2.7mm,3.0mm,3.5mm & 4.0mm Variable Angle Screws	Multiple screw options for anatomic variance strong fixation and inter-operative ease of use

The Flower Medial Column Fusion Plate – Surgical Strategy

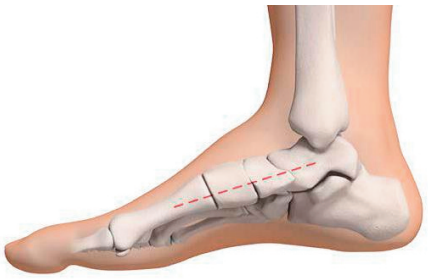
Step 1 – Exposure

a. A medial incision is made starting from the base of the medial malleolus to the middle portion of the first metatarsal. A curvilinear incision taken more dorsally will give additional exposure, this is then carried distally along the medial aspect of the Extensor Hallucis Longus tendon.

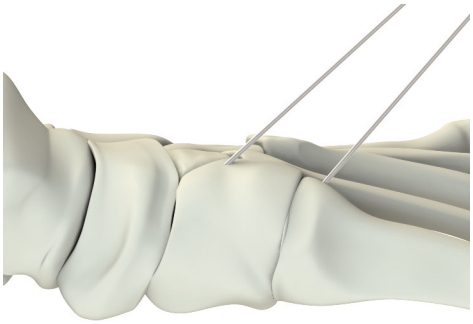
b. Make sure to develop full thickness flaps, limiting any handling of the soft tissue.

c. A sub-periosteal dissection can be completed to expose the midfoot deformity.

d. The Tibialis Anterior tendon should be identified and retracted plantar proximally, and should not need to be transected to gain exposure to the first metatarsal Cuneiform joint nor the medial Naviculo-Cuneiform joint.



Step 2 – Joint Preparation and Alignı



a. A periosteal incision is made dorsomedially under the Tibialis Anterior tendon and carried down over the 1st metatarsal. Care must be taken to avoid cutting the medial dorsal cutaneous nerve throughout the dissection. Periosteal dissection is performed with a blade more often than periotsteal elevator.

b. Expose and prepare all the joints for the fusion.

c. Preparation for the fusion can be accomplished with saggital saw, curettes, rongeurs and osteotomes.

d. Further joint preparation is done with osteotome to "shingle" or "fish scale" a k-wire or 2.0mm drill bit (DBK 027) to promote bone healing to the arthrodesis site.

e. Our technique of choice is to use frozen Femoral head to maintain length of the medial column especially in flat feet, with intercalary bone graft placed at the medial Naviculo-Cuneiform joint and 1st Metatarsal-Cuneiform joint.

f. Once joints are in the desired position, guide wires (EWK 200) are placed to maintain the joints in position for 4.0mm cannulated screw placement.

g. Guide wire is first placed from the dorsolateral aspect of the Cuneiform and driven proximally in the tuberocity of the Navicular. This can be done from proximal to distal as well.

h. A second guide wire is then driven from the proximal dorsal central aspect of the first metatarsal into the plantar proximal aspect of the medial Cuneiform for fusion of the first metatarsal-Cuneiform joint with or without intercalary bone graft. **Note:** Guide wires are provided in the E-Kit (EWK 200) or (FIM 115)

Step 3 – Insert Cannulated Screw

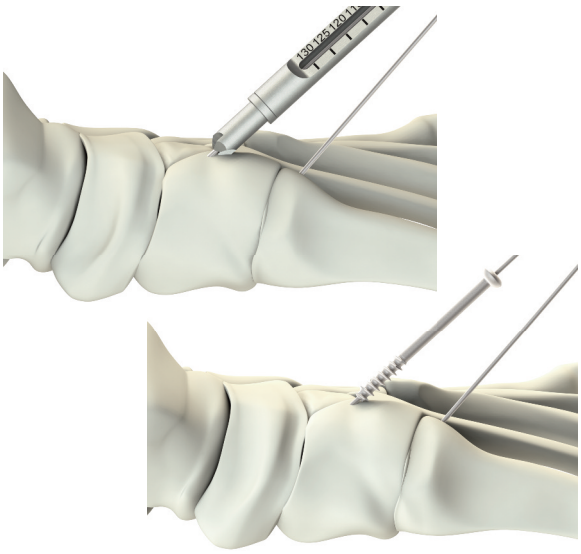
a. Confirm position of the guide wire visually and on AP, oblique and lateral x-rays. If position is adequate, a cannulated screw is then placed.

b. Countersinking for the cannulated screw may be achieved utilizing the cannulated depth gauge (EWK 200). Slide the depth gauge over the guide wire and countersink before reading the depth measurement.

c. If countersinking is not desired, simply slide the depth gauge over the guide wire and measure the required screw length with the tip of the countersink on the bone. The measurement is the shaft length of the screw, not including the thickness of the screw head.

d. Pilot hole is drilled using the Flower 2.6mm Cannulated Drill Bit (CDB 026) for 4.0mm Cannulated Screws.

e. Using the cannulated screw driver, a 4.0mm partially threaded cannulated screw is threaded over the guide wire compressing the joint. Bi-cortical placement of the cannulated screw is recommended.



Step 4 – Provisional Fixation

Align the plate and insert provisional fixation

a. Align the plate on the Navicular, 1st Cuneiform and 1st Metatarsal bone.
Tip: There are a few visual markers to aid in plate positioning. The vertical holes on the proximal end of the plate are placed at the mid portion of the navicular bone, and the compression slots should align with the cuneiform and metatarsal, respectively.

b. If bending the plate is required, plate benders (FIS 234) can be used.

c. Once the plate is in an adequate position, place olive wires in desired position to temporarily hold the plate in place on the bone.
Tip: If placing an olive wire in the slot, place in the distal end of the slot so not to interfere with the compression screw later.

Step 5 – Pilot Hole Drilling

a. 3.5mm variable angle locking screws are recommended for the Flower Medial Column Fusion Plate. Starting with the proximal Navicular locking holes and using a 2.5mm drill bit (DBK 035), a single hole is used to create a pilot hole initially. Use the locking end of the drill guide for all locking holes in the plate. It is critical to aim distal into the Navicular to avoid the Talonavicular joint. Fluoroscopy may be utilized to confirm drill bit position prior to screw placement.

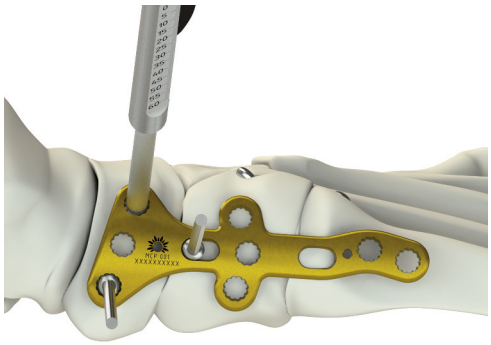
Step 6 – Screw Measurement and Insertion

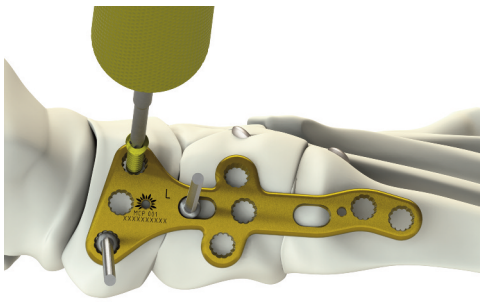
a. Extend the hook probe out of the depth gauge far enough to reach the lateral aspect of the Navicular. Insert the extended hook probe through the pilot hole and confirm this is maintained within the Navicular.

b. With the hook probe fully engaged, slide the depth gauge down to the plate so that it fully seats into the screw hole. The pilot hole depth can now be read off the distal end of the slider.

c. Place the first locking screw into the proximal Navicular screw hole using the Flower cannulated screw driver that is part of the Flower E-Kit (EWK 200).
Note: This is NOT a torque limiting screw driver. Use three-finger technique. The screws are fully inserted once flush with the top of the plate. Do not overtighten.

d. Drill the pilot holes and insert remaining proximal locking screws following the same technique as above only after the distal screws are placed and position is confirmed. If the 3 screws are placed initially into the Navicular, plate adjustment cannot be changed distally along the Cuneiform and 1st metatarsal. Therefore a non-locking compression screw is used to add compression if placed eccentrically into the distal end of the compression slots. Non-Locking Compression screws may also be used in the locking holes to compress the plate to the bones medially. Locking screws are placed after compression screws.



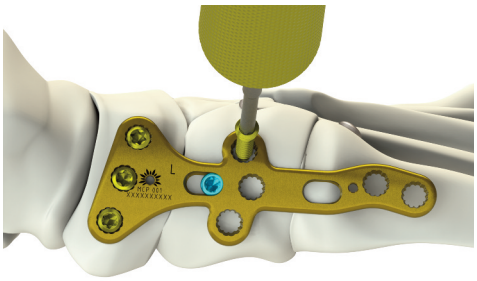


Step 7 – Compression Through the Plate

a. 3.5mm Non-Locking Compression Screws are recommended for axial compression. Place the compression end of the drill guide (DBK 035) in the distal end of the slot with the arrow pointing toward the joint. Drill the eccentric pilot hole.
Note: The compression screw in the cuneiform slot is to be placed before any locking screws are placed in the cuneiform.

b. Remove the olive wires before placing the non-locking compression screw.

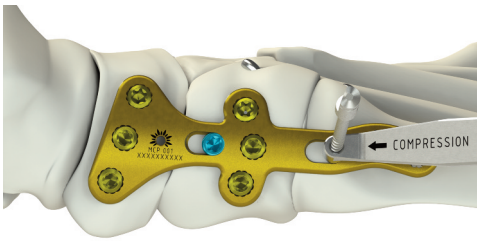
c. Measure pilot hole using the Flower Depth Gauge and place a 3.5mm compression screw.
Note: This is NOT a torque limiting screw driver. Use three finger technique for screw insertion. Screws are fully inserted once flush with the top of the plate. Do not overtighten.



Step 8 – Medial and Distal Screw Insertion

a. Compression screw must be inserted before any locking screws in the Cuneiform. Once screw is seated, locking screws are inserted. Follow previous steps for drilling pilot holes and screw measurement.

b. Compression screw must be inserted before any locking screws in the Metatarsal. Once screw is seated, locking screws are inserted. Follow previous steps for drilling pilot holes and screw measurement.



FInal Construct

The final construct sits flush contoured to the anatomy, with compression of the arthrodesis sites. Two interfragmentary screws are placed bi-cortical along with multiple staggered screw holes in the Navicular, Cuneiform and metatarsal bones that allow for excellent fixation throughout the medial column.

The Flower Medial Column Fusion Plate – Implant Selection

VARIABLE ANGLE LOCKING SCREWS

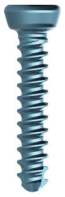
Screw Diameters	Product Description	Lengths
2.7mm	2.7mm Variable Angle Locking Screw	8mm-30mm
3.0mm	3.0mm Variable Angle Locking Screw	8mm-30mm
3.5mm	3.5mm Variable Angle Locking Screw	10mm-30mm

Additionally available. Not included in the MidFootCube

VARIABLE ANGLE NON-LOCKING COMPRESSION SCREWS

Screw Diameters	Product Description	Lengths
2.7mm	2.7mm Variable Angle Compression Screw	8mm-30mm
3.5mm	3.5mm Variable Angle Compression Screw	10mm-30mm

Additionally available. Not included in the MidFootCube

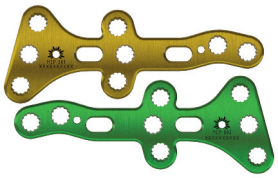


CANNULATED, PARTIALLY THREADED SCREWS

Screw Diameter	Product Description	Lengths
4.0mm	Partially Threaded Cannulated Screw	16mm-60mm

FLOWER MEDIAL COLUMN FUSION PLATES

Part #	Product Description	Lengths
MCP 001	Medial Column Fusion Plate, Left	10 - Hole
MCP 002	Medial Column Fusion Plate, Right	10 - Hole



The Flower Medial Column Fusion Plate – Single-Use Instrument Overview

DRILL BIT KITS

Part #	Contents of Kit
DBK 027	2.0mm Drill Bit and Drill Guide
DBK 030	2.0mm Drill Bit and Drill Guide
DBK 035	2.5mm Drill Bit and Drill Guide
DBK 040	3.0mm Drill Bit and Drill Guide

CANNULATED DRILL BIT KIT

Part #	Content of Kit
CDB 020	2.0mm Cannulated Drill Bit
CDB 024	2.4mm Cannulated Drill Bit
CDB 026	2.6mm Cannulated Drill Bit
CDB 030	3.0mm Cannulated Drill Bit

FLOWER E-KIT

Part #	Content of Kit
EWK 200	T15 Cannulated Screwdriver Cannulated Depth Gauge and Countersink Plating Depth Gauge 1.8mm Olive Wires (2) CoCr Guide Wires (2)

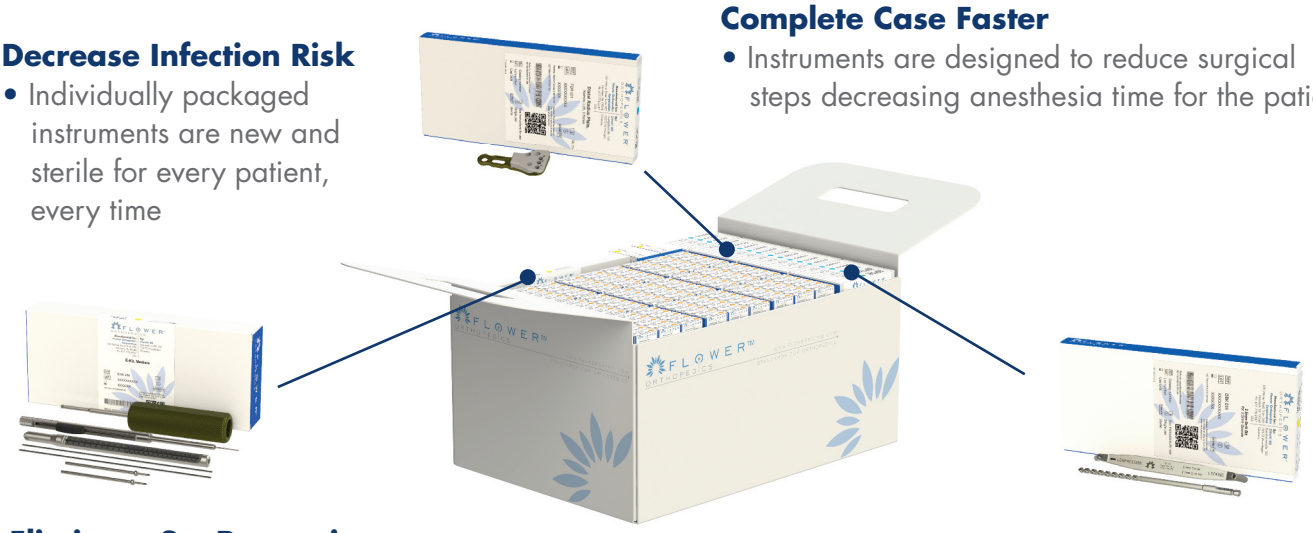
PLATE BENDERS

Part #	Content of Kit
FIM 234	Plate Bender (M) (2)

We Build a More Efficient Case

Decrease Infection Risk
- Individually packaged instruments are new and sterile for every patient, every time

Complete Case Faster
- Instruments are designed to reduce surgical steps decreasing anesthesia time for the patient



Eliminate Set Processing
- Ready-for-Surgery platform completely eliminates pre-op sterilization and post-op decontamination

Reduce OR Turn Over Time
- Single-use product in the OR leads to less delays in surgery scheduling

The FlowerCube™

Flower Orthopedics Corporation
100 Witmer Road • Suite 280 • Horsham, PA 19044 • T: 877-778-8587 • F: 215-394-8904

www.flowerortho.com