

# Anatomic Volar Distal Radius Plate

TECHNIQUE GUIDE



## INDICATIONS FOR USE:

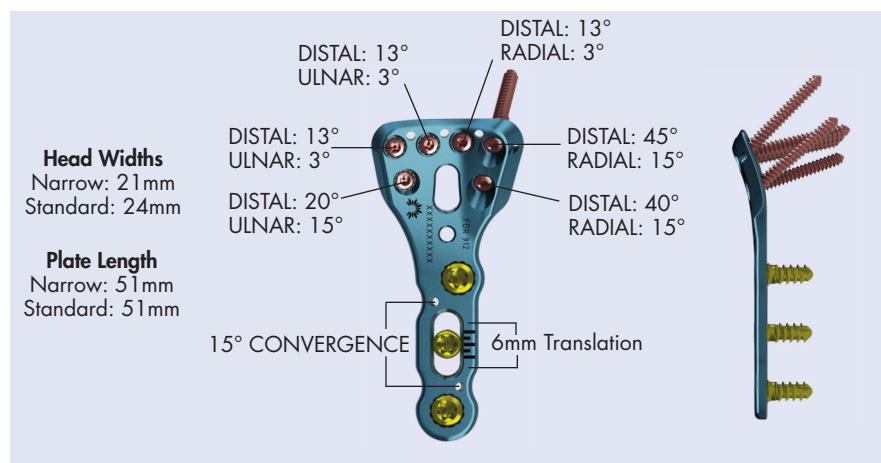
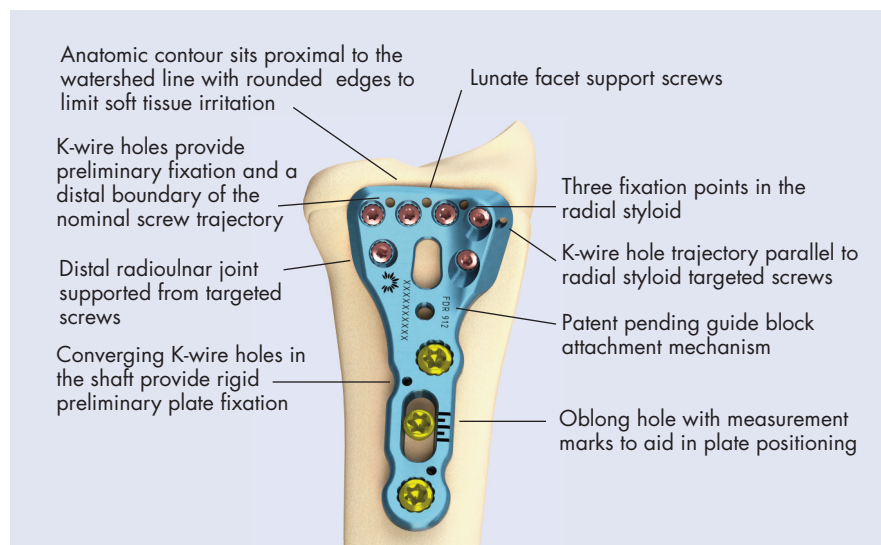
The Flower Small and Medium Implants set is intended for use for internal fixation of fractures and reconstruction of bones, including the scapula, olecranon, humerus, radius, ulna, pelvis, distal tibia, fibula, hand and foot in adults and for use in long bones in adolescents (12-21) in whom the growth 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.

# Flower Orthopedics: Volar Distal Radius Plate

The Flower Orthopedics Volar Distal Radius Plate (VDRP) brings the advantages of the FlowerCube™ concept to anatomic volar distal radius plating. The Flower Anatomic VDRP offers both variable and fixed angle locking options to meet the needs of individual surgeons and fracture patterns. Simple and efficient, the plating system is designed to address even the most complex distal radius fracture patterns.

## FEATURES

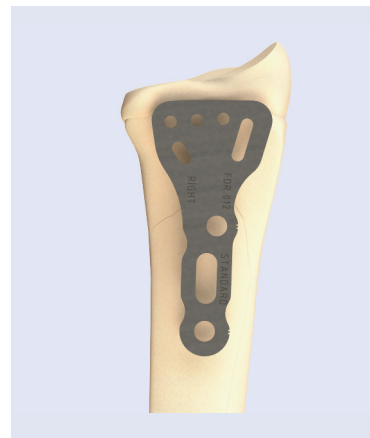
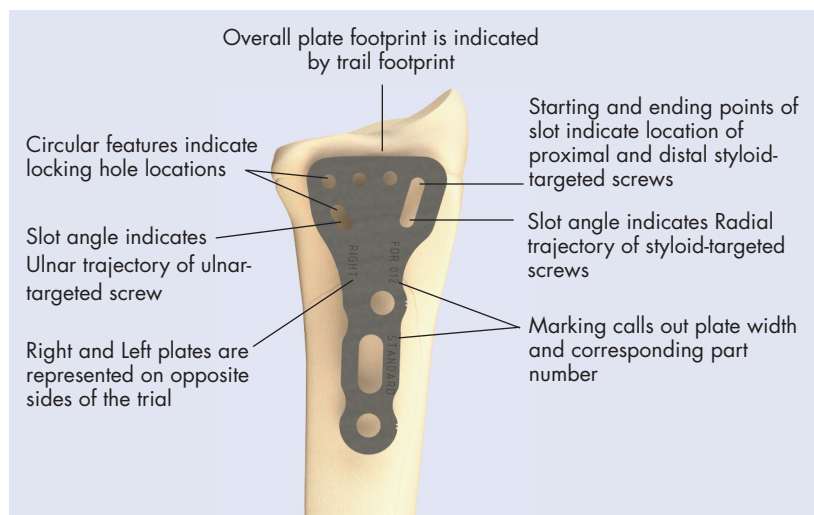
The Flower VDRP features a family of anatomic plates designed to accommodate varying patient anatomy while providing targeted distal fixation. The Anatomic Plate is packaged with a preassembled Guide Block that provides anatomically oriented distal locking fixation to target common fracture fragments of the distal radius. Alternatively, the Guide Block may be removed to allow for 10° of variability in all directions (20° cone) for each of the distal locking screws. The Guide Block and VDRP contain K-wire guides to allow for provisional plate fixation, fracture reduction, and easy evaluation of the nominal trajectory of targeted distal fixation. The anatomic contour of the Flower VDRP closely matches the native distal radius and can be used as an aid in fracture reduction. The Flower VDRP is low profile and sits proximal to the watershed line, reducing the possibility of tendon irritation.



# Surgical Technique

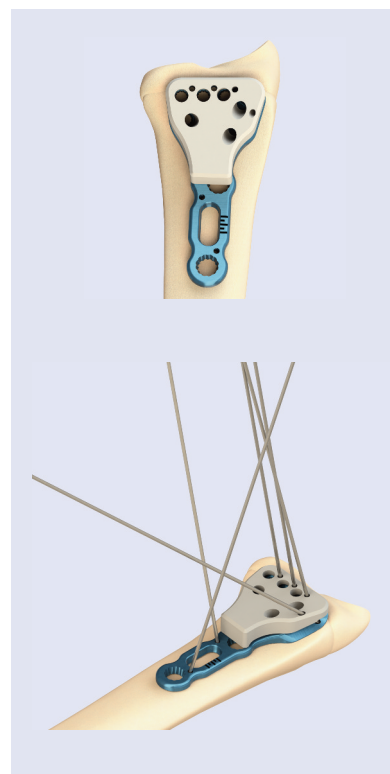
## IMPLANT SELECTION – TRIALS

The Flower Anatomic VDRP plates are available in narrow (21 mm) and standard (24 mm) widths. To assist the surgeon in choosing the appropriate plate, Trials are available in the Distal Radius FlowerCube™. Following a standard volar approach and provisional reduction, the Flower VDRP Trial is positioned on the distal radius in its anatomic position. Fluoroscopic imaging is used to evaluate the placement, width and screw trajectories as depicted on the trial. The appropriately sized trial should provide fixation into the volar ulnar corner while providing targeted fixation into the radial styloid. Occasionally, there may be a need to take advantage of the variable angle locking capabilities of the Flower VDRP to accurately target the radial styloid when the patient's anatomy is unusually narrow or wide. This can be done by removing the Guide Block and placing screws within the 20° cone.



## PLATE PLACEMENT AND PROVISIONAL FIXATION

A provisional reduction is performed. The Flower VDRP with attached Guide Block is then positioned over the distal radius in its anatomically defined position, which is just proximal to the watershed line. K-wires can be passed through the distal holes of the Guide Block and through the plate to provisionally position the plate and hold reduction of the fracture. Fluoroscopic evaluation is used to determine the adequacy of reduction, plate position, distal row and radial styloid screw trajectory. The K-wires of the distal row will always pass distal to and at the same angle as screws inserted through the Guide Block. This serves as a useful guide to prevent penetration of screws into the radial carpal joint. The radial styloid-targeted K-wire will pass just radial and parallel to the radial styloid screw trajectory. Note that the trajectory of K-wire holes on the shaft of the plate are angled 10° radially for the distal shaft hole and 10° ulnarly for the proximal shaft hole. This serves to provide additional provisional fixation when needed for complex fractures.



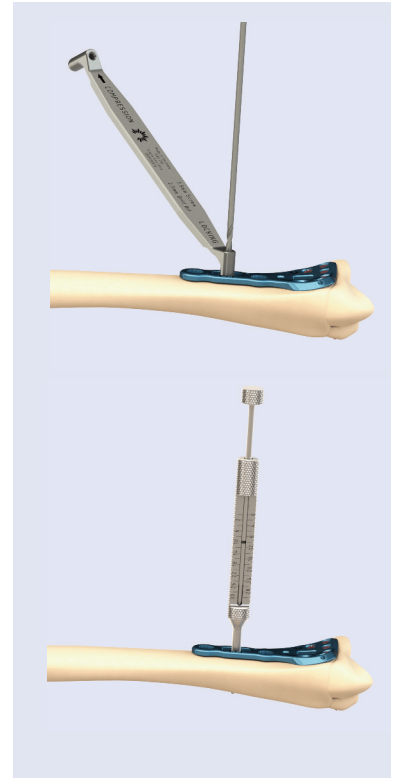
## DEFINITIVE FIXATION

Once the reduction of the distal radius and provisional plate position is acceptable, fixation may proceed proximally or distally depending on fracture type. At times, it is advantageous to secure the plate to the radial shaft first, followed by further reduction of the distal fragment and fixation distally. Conversely, the distal radius fragments can first be fixed to the plate distally. With this technique, the plate can then be used as a joystick to adjust the translation, inclination, length and tilt of the distal fragments. Fracture pattern and surgeon preference will determine the order of fixation.

## FIXATION OF THE PLATE TO THE SHAFT

The shaft locking holes may be used with locking or non-locking screws. The oblong hole may only be used with non-locking screws and allows translation of the plate distally or proximally with measurement marks in 1mm increments. Select the DBK 035 2.5mm drill bit and guide. This combination of instruments will be used for all shaft fixation regardless of whether locking or non-locking screws are used. Drill the 2.5mm pilot hole for the screws. The locking holes will accommodate 15° of angulation in all directions without compromising the locking mechanism. After drilling the pilot hole, use the combination drill guide and depth gauge (FDR 991) in conjunction with the hook-tip probe (KWK 900) to measure the appropriate screw length. The guide will fit through the plate and sit flush on the bone. Select the appropriate length 3.5mm locking or non-locking screw. Use the GOLD screwdriver to insert and seat the desired screw. Use all three proximal holes for optimal fixation of the plate to the shaft.

**Tip:** Use a three finger tightening technique to lock the shaft screws. The screw driver is not torque limiting. Do not over tighten.



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## DISTAL SCREW INSERTION

There are six distally targeted 2.4 mm screw holes available to provide fixation for the distal radius fragments. Screws or Pegs may be inserted in any combination using one of two techniques:

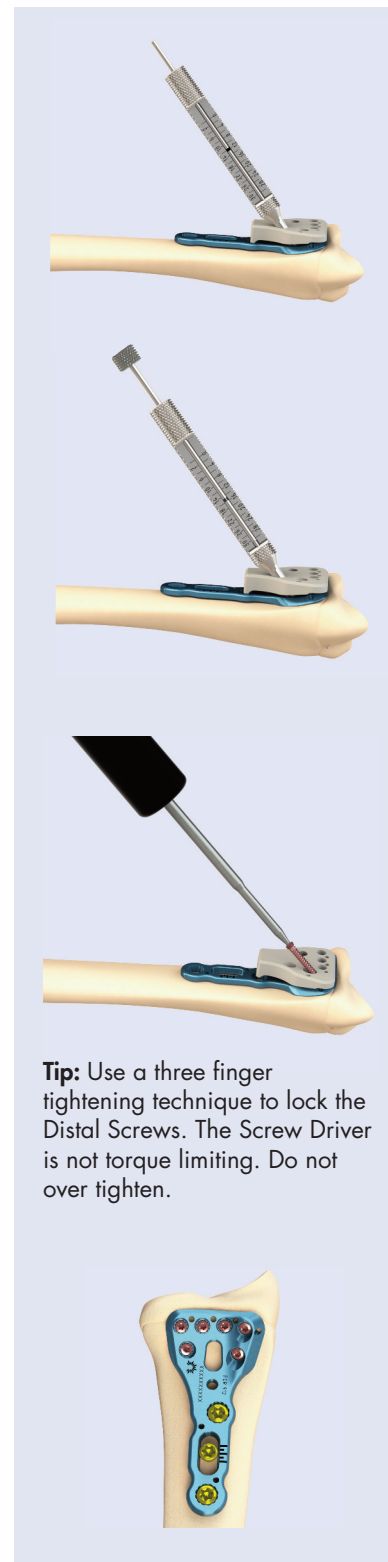
### 1) Targeted fixed-angle screw fixation using the Guide Block

The Guide Block has been designed to provide targeted fixation nominally along the axis of the targeted screw holes. With the Guide Block securely affixed to the plate, place the FDR 991 Drill Guide into a Guide Block hole. Ensure that the guide is firmly seated through the block and into the locking hole. Use the 1.8mm calibrated drill to create a pilot hole. Read the screw length from the laser mark on the Drill Bit. Use the Hook Tip Probe through the Drill Guide to measure the screw length. It is important that the distal screws not protrude beyond the distal aspect of the radius bone as this may lead to extensor tendon irritation and rupture. Using the BLACK handled screwdriver, insert the appropriate length 2.4mm locking screw (or 1.8mm locking peg) through the block. In general, it is best to proceed in an ulnar to radial fashion along the distal row.

### 2) Variable angle screw fixation

For Variable Angle (up to  $\pm 10^\circ$ ) Screw insertion, the Guide Block is removed by prying the block off the plate. The Guide Block can be reattached to the plate by firmly pressing it into its original position. Once the Guide Block has been removed, the 1.8mm drill guide is seated into the locking hole within a  $20^\circ$  cone. Using the BLACK handled screwdriver, insert the appropriate length 2.4mm locking screw (or 1.8mm locking peg) along the chosen trajectory. Screw length is measured from the laser mark on the Drill Bit or Hook Tip Probe.

**Note:** For Variable Angle Screw Insertion without the Guide Block, the drill guide from DBK 024 may provide the surgeon with additional ergonomic benefit



## CLOSURE

Following completion of distal and proximal fixation, final fluoroscopic imaging should be performed to ensure adequate reduction of the fracture, appropriate position of the plate, and trajectory and length of all screws. Remove the Guide Block and ensure that all screws are well seated into the plate. Closure may proceed according to surgeon preference. Rotate a flap of the pronator quadratus distally to cover the distal aspect of the plate. This flap may be secured to the volar capsule using absorbable sutures. This optional step provides additional protection for the flexor tendons. Following closure the patient is splinted according to surgeon preference.

# Implants

FDR 001 – Narrow, Left



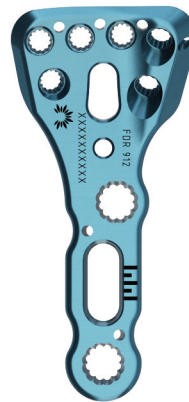
FDR 002 – Narrow, Right



FDR 011 – Standard, Left



FDR 012 – Standard, Right





# Screws

1.8mm Variable Angle Locking Pegs	
FDR 116	Variable Angle Locking Peg, D:1.8mm x L:16.0mm
FDR 118	Variable Angle Locking Peg, D:1.8mm x L:18.0mm
FDR 120	Variable Angle Locking Peg, D:1.8mm x L:20.0mm
FDR 122	Variable Angle Locking Peg, D:1.8mm x L:22.0mm
2.4mm Variable Angle Locking Screws	
FHF 108	Variable Angle Locking Screw, D:2.4mm x L:8.0mm
FHF 110	Variable Angle Locking Screw, D:2.4mm x L:10.0mm
FHF 112	Variable Angle Locking Screw, D:2.4mm x L:12.0mm
FHF 114	Variable Angle Locking Screw, D:2.4mm x L:14.0mm
FHF 116	Variable Angle Locking Screw, D:2.4mm x L:16.0mm
FHF 118	Variable Angle Locking Screw, D:2.4mm x L:18.0mm
FHF 120	Variable Angle Locking Screw, D:2.4mm x L:20.0mm
FHF 122	Variable Angle Locking Screw, D:2.4mm x L:22.0mm
FHF 124	Variable Angle Locking Screw, D:2.4mm x L:24.0mm
FHF 126	Variable Angle Locking Screw, D:2.4mm x L:26.0mm
FHF 128	Variable Angle Locking Screw, D:2.4mm x L:28.0mm
FHF 130	Variable Angle Locking Screw, D:2.4mm x L:30.0mm
2.4mm Variable Angle Non-Locking Screws	
FBS 114	Variable Angle Non-Locking Screw, D:2.4mm x L:14mm
FBS 116	Variable Angle Non-Locking Screw, D:2.4mm x L:16mm
FBS 118	Variable Angle Non-Locking Screw, D:2.4mm x L:18mm
FBS 120	Variable Angle Non-Locking Screw, D:2.4mm x L:20mm
FBS 122	Variable Angle Non-Locking Screw, D:2.4mm x L:22mm
FBS 124	Variable Angle Non-Locking Screw, D:2.4mm x L:24mm
3.5mm Variable Angle Locking Screws	
FRP 308	Variable Angle Locking Screw, D:3.5mm x L:8.0mm
FRP 310	Variable Angle Locking Screw, D:3.5mm x L:10.0mm
FRP 312	Variable Angle Locking Screw, D:3.5mm x L:12.0mm
FRP 314	Variable Angle Locking Screw, D:3.5mm x L:14.0mm
FRP 316	Variable Angle Locking Screw, D:3.5mm x L:16.0mm
FRP 318	Variable Angle Locking Screw, D:3.5mm x L:18.0mm
3.5mm Variable Angle Non-Locking Screws	
FBS 308	Variable Angle Non-Locking Screw, D:3.5mm x L:8.0mm
FBS 310	Variable Angle Non-Locking Screw, D:3.5mm x L:10.0mm
FBS 312	Variable Angle Non-Locking Screw, D:3.5mm x L:12.0mm
FBS 314	Variable Angle Non-Locking Screw, D:3.5mm x L:14.0mm
FBS 316	Variable Angle Non-Locking Screw, D:3.5mm x L:16.0mm
FBS 318	Variable Angle Non-Locking Screw, D:3.5mm x L:18.0mm

**Note:** 2.4mm Variable Angle Non-Locking Screws may be ordered 6mm-30mm. 3.5mm Variable Angle Locking and Non-Locking Screws may be ordered 8mm-30mm.



# Instruments

## FDR 992 – Distal Radius Plate Trials



## FDR 991 – 1.8mm Drill Bit for 1.8mm Pegs and 2.4mm Screws

- ▶ Drill Guide/Depth Gauge
- ▶ 1.8mm Drill Bit



## DBK 024 - 1.8mm Drill for 2.4mm Screws

- ▶ Drill Guide
- ▶ 1.8mm Drill Bit



## DBK 035 – 2.5mm Drill Bit for 3.5mm Screws

- ▶ 2.5mm Drill Bit
- ▶ Drill Guide



## KWK 900 – Distal Radius K-Wire Kit

- ▶ 3.5mm Screwdriver – GOLD
- ▶ Hook Tip Probe – Measure screw length with Drill Guide/Depth Gauge
- ▶ 2.4mm Screwdriver – BLACK
- ▶ K-Wires: 1.4mm x 140mm (QTY 6)







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