Surgical Technique

D-RAD SMART PACK®
Single-Use Volar Distal Radius Plating System
Nota Bene

The technique description herein is made available to the healthcare professional to illustrate the author’s suggested treatment for the uncomplicated procedure. In the final analysis, the preferred treatment is that which addresses the needs of the specific patient.
Indications

The D-RAD SMART PACK™ Single-Use Volar Distal Radius Plating System is indicated for the fixation of fractures involving the distal radius.

Contraindications

1. Physical conditions that would preclude adequate implant support or retard healing, such as, blood supply impairment, insufficient bone quality or quantity, previous infection, obesity, severe bow or gross distortion of the radius.
2. Mental conditions that preclude cooperation with the rehabilitation regimen.
D-RAD SMART PACK™ product overview

4-Hole Volar Plate

- **1.4mm K-wire hole** to enable centering of the plate on the diaphysis
- **2.4mm Variable-Angle Locking Screws**
- **2.4mm Cortex Screws**
  - Anatomically contoured to respect the watershed line while providing reconstructive articular support
- **1.4mm K-wire holes for distal plate positioning**
- **Slotted 1.4mm K-wire hole or slotted screw hole to allow for proximal/distal plate adjustments**
- **1.8mm Variable Angle Locking Pegs** for bicortical support of the metaphysis while minimizing dorsal soft tissue irritation

**Screws/Pegs**

- **2.4mm Cortex Screws** (10 – 24mm)
- **2.4mm Variable-Angle Locking Screws** (10 – 24mm)
- **1.8mm Variable Angle Locking Pegs** (12 – 24mm)

**Standard and wide options accommodate varying patient anatomy**

**VLP™ locking technology** enables the use of Cortex Screws, Locking Screws or Locking Pegs within a 30° cone
Instrumentation

Self-retaining T7 screw driver

1.4mm K-wires assist with plate positioning and reference screw trajectories

Fixed-angle drill guide predetermines screw trajectories

Variable-angle drill guide enables intraoperative screw placement flexibility

Preassembled guide block and plate holder

Hooked, laser-etched depth gauge grabs the dorsal cortex

1.8mm drill for cortex screws, locking screws and locking pegs
Surgical technique

OR setup
Single-Use Kits are packaged sterile with a left or right “4-hole” volar distal radius plate and include single-use instruments needed for implantation. Left and right plates are available in two widths (standard and wide) to accommodate varying patient anatomy. In addition to Single-Use Kits, the Screw and Template Tray containing a variety of screws, pegs, and templates will be needed to conduct the procedure. The Screw and Template Tray should be positioned outside of the sterile field as the unit is non-sterile and should not be sterilized. The lid can be removed and nested underneath the tray.

Note: Soft tissue retractors, fracture reduction instruments and longer plates are not available in the D-RAD SMART PACK™ Single-Use Volar Distal Radius Plating System.

Note: OR setup should include the appropriate wire driver(s) needed to utilize 1.4mm K-wires for plate positioning and a 1.8mm Drill Wire for screw preparation.

Plate Templates are available in left and right, standard and wide options and exactly match the width, length and contour of their respective Plates.

Open the appropriate Plate Template box (right or left) and place the single-use standard and wide plate templates on the back table in preparation for the Single-Use Kit selection step.

Note: A Single-Use Kit should only be opened after the appropriate plate size has been determined by the Single-Use Plate Templates during the “Single-Use Kit Selection” step of the procedure.
**Patient positioning**  
The patient should be placed in the supine position with the affected limb positioned to expose the surgical site.

**Incision**  
A longitudinal incision is made in Henry’s interval at the wrist (flexor carpi radialis and radial artery). Carry the dissection to the pronator quadratus. Elevate the pronator quadratus to reveal the fracture site.

**Fracture reduction**  
After exposure and debridement of the fracture site, the fracture is reduced and provisionally fixed under fluoroscopy, if necessary.

**Single-Use Kit selection**  
Using the previously opened Plate Templates, confirm the plate width that will best accommodate the patient’s anatomy and fracture pattern by applying the distal portion of each Template to the approximate watershed line.

Once the proper plate width has been determined via the Plate Templates, open the corresponding Single-Use Kit and introduce the sterile tray into the sterile field.

**Plate positioning**  
Remove the Plate and preassembled Guide Block from the Single-Use Kit. Place them into the wound and onto the affected distal radius.

The Plate has been designed with a variety of 1.4mm K-wire holes to assist with plate positioning. A wire driver should be used to advance the provided 1.4mm K-wires through the plate to provisionally position it on the bone.
Screw hole preparation
The Plate may be implanted using either a "shaft-first" or "distal-first" fixation method.

The Guide Block combined with the VLP™ locking mechanism offers users the option of fixed, predesigned screw trajectories through the use of the Fixed Angle Drill Guide or variable-angle screw trajectories by using the Variable Angle Drill Guide.

**Note:** It is still possible to misplace screws into the radiocarpal joint using the variable-angle capability of the plate even when the K-wires appear to be well placed. Always confirm safe screw placement with fluoroscopy.

**Note:** The Guide Block limits screw trajectories to a 30° cone or 15° in any direction when using the Variable Angle Drill Guide. Screw angles should not exceed this in order for the VLP locking mechanism to work properly. Additionally, exceeding 15° off axis may cause unacceptable screw head prominence.

**Note:** Regardless of which drill guide is used (Fixed Drill Guide or Variable Angle Drill Guide), fluoroscopy should always be used to confirm safe drill placement due to the variability of patient anatomy and fracture patterns.

Insert the star tip of the Fixed or Variable Angle Drill Guide into the desired hole and drill accordingly with the 1.8mm Drill Wire. Screw length can be determined by reading the exposed laser-etched line on the 1.8mm Drill Bit through the window of the Drill Guide. Alternatively, a Depth Gauge with a laser-etched line has been provided and can be used through the Drill Guide to determine proper screw length.
Note: Drilling multiple screw holes without the plate firmly secured to the bone can cause misalignment between the Locking Screw/Peg heads and the Plate. This can lead to engagement difficulties. It’s advised that a Screw/Peg be placed in a prepared hole prior to additional holes being drilled.

**Screw selection**
2.4mm Cortex Screws, 2.4mm Locking Screws and 1.8mm Locking Pegs are contained in sterile tamper-evident vials and are organized by type and size within the Screw and Template Tray. Once the appropriate screw or peg has been identified, twist the non-sterile cap off of the vial and allow the sterile inner container to drop into the sterile field. Flip the cap of the sterile container up and remove the screw or peg with the provided T7 Self-Retaining Driver by engaging the head. Alternatively, the screw or peg can be removed by turning the inner container upside-down and allowing the screw or peg to fall out.

D-RAD SMART PACK® screws and pegs are packaged sterile thus eliminating the need to confirm length before insertion. However, a screw/peg scale has been provided in the Single-Use Kit should one be needed.

Note: When using the screw/peg scale provided on the Single-Use Kit tray, ensure that the top surface of the screw/peg head is in contact with the top surface of the scale.
**Screw insertion**
Use the T7 Self-Retaining Driver to insert the appropriate length 2.4mm Cortex Screws, 2.4mm Locking Screws and 1.8mm Locking Pegs. Screws and Pegs can be inserted through the Guide Block.

**Note:** A moderate amount of downward pressure should be applied through the driver when the head of a Locking Screw or Locking Peg begins to engage the Plate.

**Note:** The non-locking screw hole in the metaphyseal area of the plate has been designed to only accept a cortex screw.

**Note:** Fluoroscopy should always be used to confirm safe screw placement due to the variability of patient anatomy and fracture patterns.

**Guide block removal**
Once distal screw insertion is complete, use the T7 Self-Retaining Driver to turn the Plate Holder counter-clockwise and subsequently remove the Guide Block from the Plate.

**Final imaging**
Obtain final radiographic images to confirm optimal screw placement and length. Be certain that the plate fits dorsal to the volar lip of the radius to help avoid tendon injury.

**Closure**
If possible, repair the pronator quadratus over the plate. Wound closure as per surgeon preference.
D-RAD SMART PACK™
Single-Use Volar Distal Radius Plating System

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