

medartis

PRECISION IN FIXATION

Wrist 2.5 Product Overview



APTUS

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About Medartis

Medartis, headquartered in Basel, Switzerland, specializes in technical high-precision implant systems for surgical fixation of bone fractures and osteotomies.

Medartis develops, manufactures and sells titanium screws and plates, surgical instruments and system solutions for fracture fixation in the upper and lower extremities.

Our motto is «Precision in fixation». Since the company's founding in 1997, we place the highest priority on maintaining stringent quality standards, continuous further development and innovation as well as comprehensive service provision.

Medartis is represented worldwide through its subsidiaries and a broad distributor network.



Comprehensive Solutions for the Wrist

One system for the treatment of:

Distal Radius Plates

- Intra- and extraarticular fractures of the distal radius
- Correction osteotomies of the distal radius

Distal Ulna Plates

- Intra- and extraarticular fractures of the distal ulna

Ulna Shortening Plate

- Osteotomies of the ulna

Fusion Plates

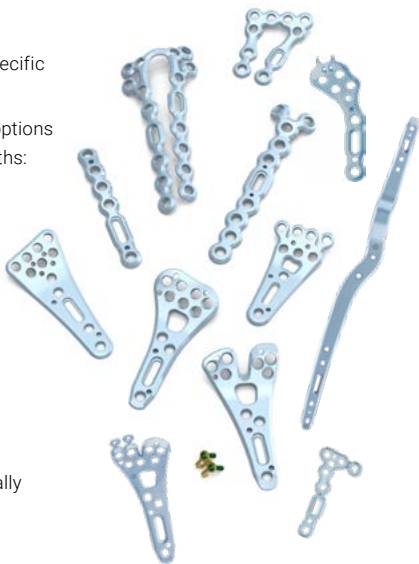
- Arthrodesis of wrist bones

One system size – user-friendly and efficient

- Internal fixator principle for early mobilization
- Worldwide over 100,000 clinical cases per year

Plates

- Anatomical and fracture-specific implant designs
 - Medartis offers treatment options in different widths and lengths:
 - Fracture plates
 - Frame plates
 - Correction plates
 - ADAPTIVE plates (watershed line design)
 - Dorsal plates
 - Spanning plates
 - Hook plates
 - Fracture plate for minimally invasive surgery
 - Distal ulna plates
 - Arthrodesis plates
 - Ulna shortening plate
 - Rounded edges and a smooth surface for soft tissue protection
 - Consistent screw diameter of 2.5 mm*
- * Exception: Hook plates – self-drilling 1.5 SpeedTip screws

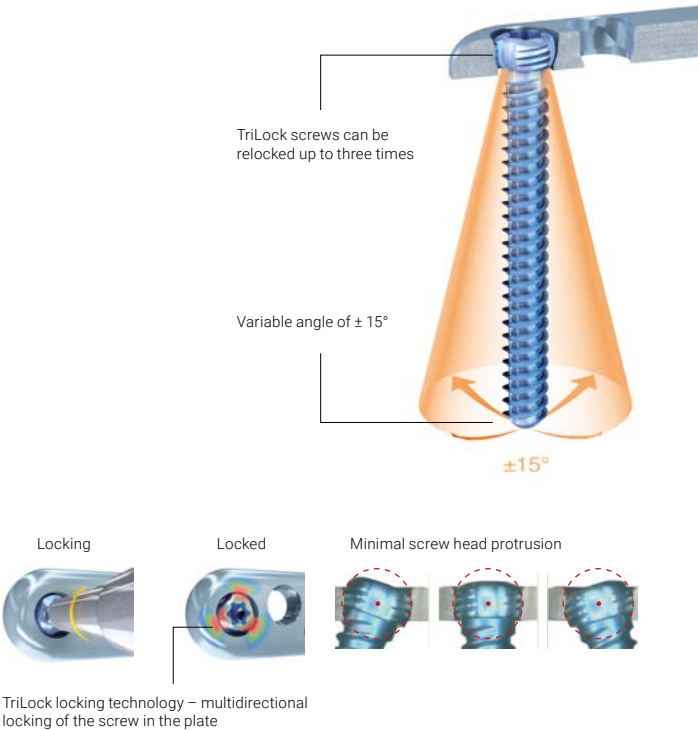


APTUS Technologies

All APTUS systems are based on the multidirectional and angular stable TriLock locking technology.

TriLock locking technology

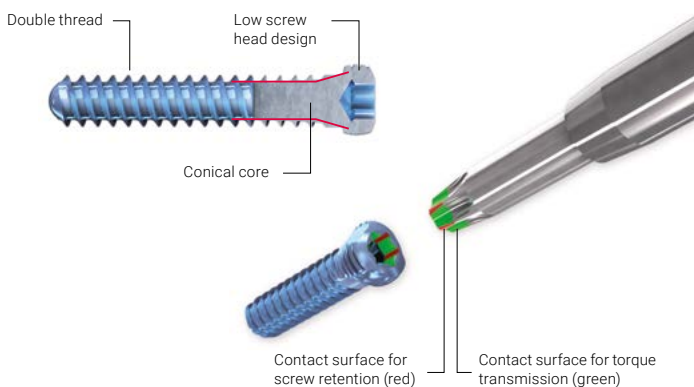
- TriLock locking technology – multidirectional locking of the screw in the plate
 - Spherical three-point wedge-locking
 - Friction locking through radial bracing of the screw head in the plate – without additional tensioning components
- TriLock^{PLUS} screw holes offer the advantage of compression and angular stable locking in one step
- Screws can pivot freely up to $\pm 15^\circ$ in all directions for optimal positioning
- Fine-tuning capabilities of fracture fragments
- TriLock screws can be relocked in the same screw hole at individual angles up to three times
- Minimal screw head protrusion thanks to internal locking contour
- No cold welding between plate and screws



APTUS Technologies

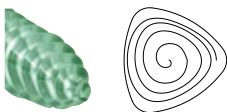
Screw technology

- HexaDrive screw head design
 - HexaDrive interface with self-holding properties between screw and screwdriver
 - Increased torque transmission
 - Simplified screw pick-up due to the self-holding technology
- Soft tissue protection due to smooth screw head design
- Atraumatic screw tip offers soft tissue protection when inserting screws bicortically
- Increased torsional, bending and shear stability due to conical core
- Precision-cut thread profile for sharpness and self-tapping properties
- Double-threaded TriLock screws reduce screw insertion time



SpeedTip thread design

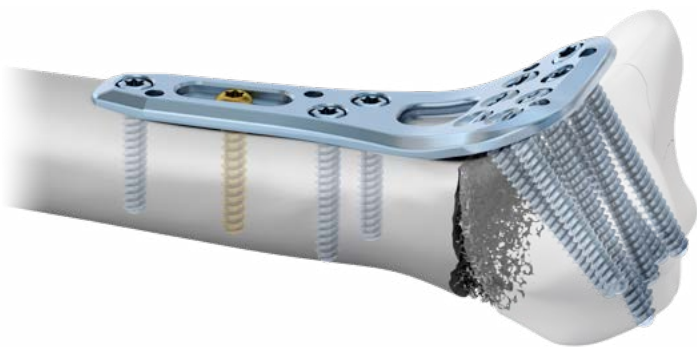
- Functionally unique cutting with immediate bite¹
- Immediate cutting of the bone with only slight axial pressure
- The triangular tip design permits simultaneous drilling, tapping and compression of the bone tissue during insertion for increased pull-out stability^{2,3}
- Reduced insertion torque thanks to the polygonal tip and tapered shaft



2.5 ADAPTIVE II TriLock Distal Radius Plates, Volar

Typical clinical findings

- Fractures involving the lunate facet and the DRUJ



Subchondral buttressing of the RCJ and DRUJ
due to the possibility of converging screw placement

2.5 ADAPTIVE II TriLock Distal Radius Plates, Volar

Features and benefits

- Stabilization of the sigmoid notch and the lunate facet
- Three different widths to meet individual anatomical requirements
- Radiolucent drill guide block available for rapid and easy angulation of screws

Second distal screw row provides stabilization of the dorsal rim

First distal screw row for support of the central aspect of the radio carpal joint

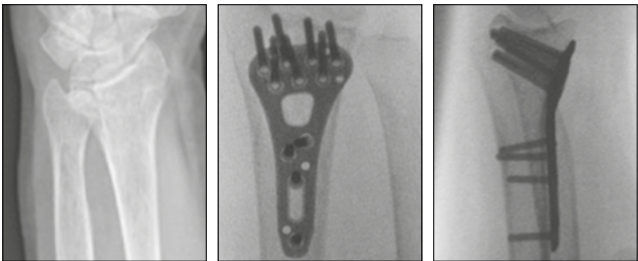
Chamfered distal plate edge

Improved anatomical fit* adapted to the volar aspect of the distal radius



* Evaluated on 250 cadaver bones

Clinical Example



Preoperative X-ray

Postoperative X-rays

Clinical example published with the kind permission of: B. Schick, Sydney, Australia

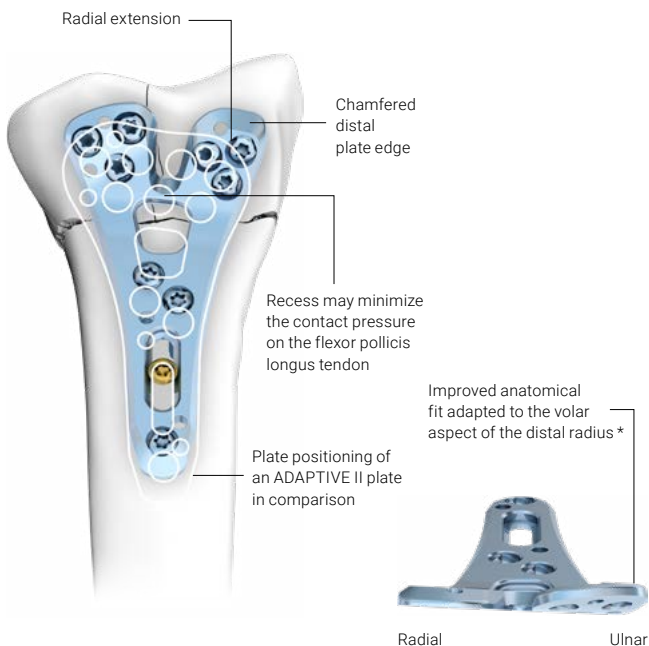
2.5 TriLock Distal Radius Plates, FPL, Volar

Typical clinical findings

- Very distal fractures
- Fractures involving the lunate facet, the DRUJ and the radial styloid

Features and benefits

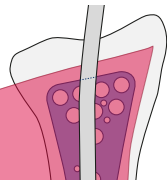
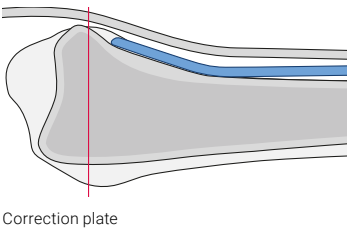
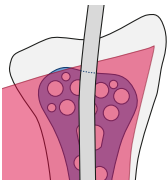
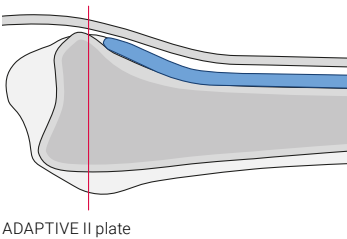
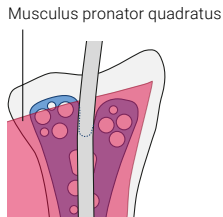
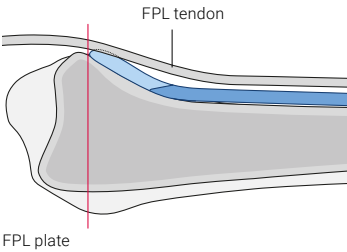
- Stabilization of the sigmoid notch, the lunate facet and improved radial support
- Very distal plate positioning possible
- Y-shape with a central recess may minimize the contact pressure on the flexor pollicis longus tendon
- Radiolucent drill guide block available for rapid and easy angulation of screws



* Evaluated on 250 cadaver bones

2.5 TriLock Distal Radius Plates, FPL, Volar

Longitudinal section along the axis of the FPL tendon



Clinical Example



Preoperative X-ray

Postoperative X-rays

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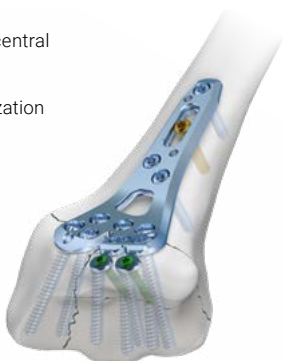
2.5 TriLock Distal Radius Rim Plates, Volar

Typical clinical findings

- Complex, intraarticular fractures with volar rim fragments

Features and benefits

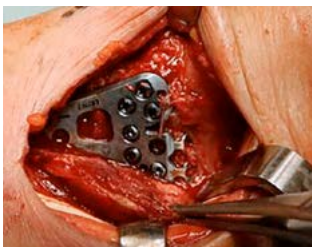
- Bendable distal flaps
 - For support and fixation of volar rim fragments
 - Can be used for the insertion of 1.5 SpeedTip screws or as suture holes for additional soft tissue fixation
- Anatomically precontoured plate
- Improved anatomical fit*
- Low plate profile of 1.8 mm
- First distal screw row for support of the central aspect of the radiocarpal joint
- Second distal screw row provides stabilization of the dorsal rim



Clinical Example



Preoperative CT scan



Intraoperative image

Clinical example published with the kind permission of the author.

* Evaluated on 250 cadaver bones

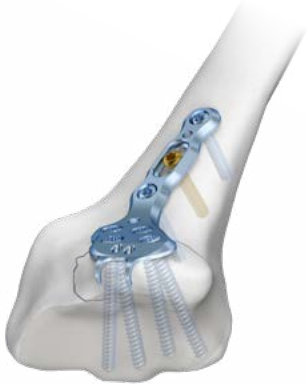
2.5 TriLock Lunate Facet Plates, Volar

Typical clinical findings

- Isolated volar rim fragments or bony ligament avulsions

Features and benefits

- Combination of hook plate and TriLock plate for fixation of isolated, ulnar-sided rim fragments
- Stabilization of the sigmoid notch and the lunate facet
- Distal suture holes for additional soft tissue fixation
- Chamfered distal plate edge for minimal implant protrusion
- Low plate profile of 1.6 mm



Clinical Example



Preoperative X-ray



Intraoperative image



Postoperative X-ray

Clinical example published with the kind permission of: J. Grünert, St. Gallen, Switzerland

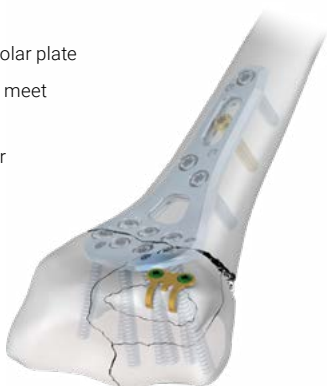
1.5 Hook Plates

Typical clinical findings

- Small, very distal fracture fragments or bony ligament avulsions

Features and benefits

- Low plate profile (0.6 mm) and non-protruding screw heads
- Hook plate designed to capture rim fragments and bony ligament avulsions
- Plate can be positioned below the volar plate
- Two different widths and lengths to meet individual anatomical requirements
- Self-drilling 1.5 SpeedTip screws for fast and easy insertion



1.5 SpeedTip



Hook plate,
2 holes



Hook plate,
4 holes



Hook plate,
6 holes



Hook plate,
12 holes

Clinical Example



Preoperative X-ray



Intraoperative image



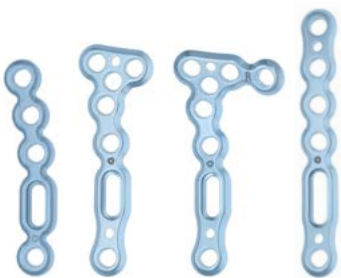
Postoperative X-ray

Clinical example published with the kind permission of the author.

2.5 TriLock Distal Radius Small Fragment Plates

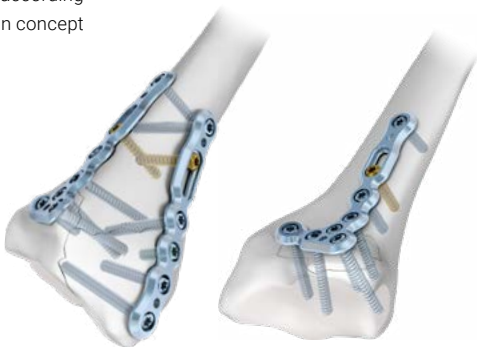
Typical clinical findings

- For fracture-specific treatment of isolated simple to complex intraarticular fractures



Features and benefits

- Low plate profile of 1.6 mm
- Anatomical plate design, easy to bend for the desired fit
- Small fragment plates in L, T and straight design to address individual fracture patterns and anatomies
- Internal fixation of the intermediate and radial column according to the three-column concept



Clinical Example



Preoperative X-rays



Postoperative X-ray

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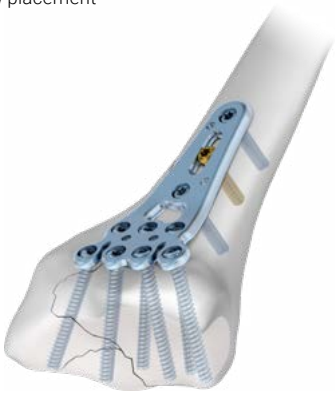
2.5 TriLock Distal Radius Fracture Plates, Volar

Typical clinical findings

- Intraarticular fractures
- Fractures with radial fragment

Features and benefits

- Low plate profile of 1.6 mm
- First distal row can be bent individually to match the anatomy
- Window enables viewing of the fracture position
- Support of extension fractures with involvement of the radial styloid
- Buttressing of the RCJ and DRUJ due to the possibility of converging screw placement



Clinical Example



Preoperative X-ray



Intraoperative image



X-ray

Clinical example published with the kind permission of: H. Krimmer, Ravensburg, Germany

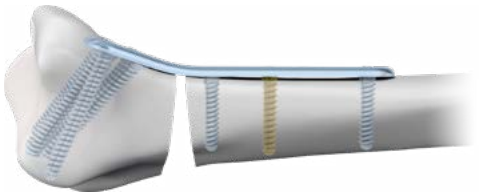
2.5 TriLock Distal Radius Correction Plates, Volar

Typical clinical findings

- Corrections of length and angle
- Intraarticular fractures
- Fractures with radial fragment

Features and benefits

- Low plate profile of 1.6 mm
- Applicable also for complex radius reconstructions
- Fixation of transplant possible
- Distal plate edge for simplified finding and adjusting the ulnar inclination angle
- Support of extension fractures with involvement of the radial styloid
- Buttressing of the RCJ and DRUJ due to the possibility of converging screw placement



Clinical Example



Preoperative X-ray



Intraoperative image



Postoperative X-ray

Clinical example published with the kind permission of: H. Krimmer, Ravensburg, Germany

2.5 TriLock Distal Radius Frame Plates, Volar

Typical clinical findings

- Intraarticular fractures
- Fractures with radial fragment



Features and benefits

- Low plate profile of 1.6 mm
- Frame design allows for individual adaptation to anatomy
- Double shaft design provides high rotational stability
- Compact plate design for short incisions
- Support of extension fractures with involvement of the radial styloid
- Frame design enables screw placement in the radial as well as the ulnar margin for an even better purchase



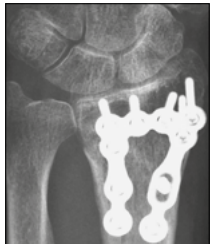
Clinical Example



Preoperative X-ray



Intraoperative image



Postoperative X-ray

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2.5 TriLock Distal Radius Fracture Plates, Extraarticular, Volar

Typical clinical findings

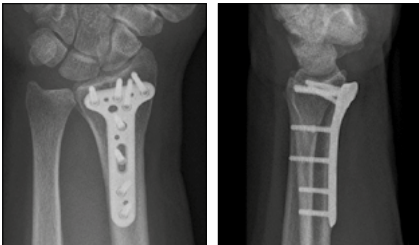
- Extraarticular fractures

Features and benefits

- Plate profile of 2.0 mm
- Support of extension fractures with involvement of the radial styloid
- Buttressing of the RCJ and DRUJ due to the possibility of converging screw placement



Clinical Example



Postoperative X-rays

Clinical example published with the kind permission of the author.

2.5 TriLock Distal Radius Plates XL, Volar

Typical clinical findings

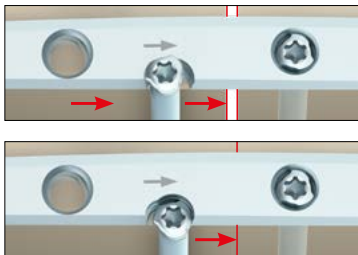
- Diaphyseal-metaphyseal radius fractures
- Correction osteotomies

System components

- TriLock^{PLUS} screw holes combine compression and angular stability in one step

Features and benefits

- Stable fixation with a variable plate thickness in the shaft of 3.2 mm to 1.8 mm distally
- Buttressing of the RCJ and DRUJ due to the possibility of converging screw placement
- Anatomical plate design in the shaft and distal area, available in three different lengths



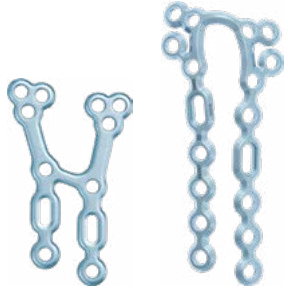
TriLock^{PLUS} with compression of 1 mm



2.5 TriLock Distal Radius Plates, Dorsal

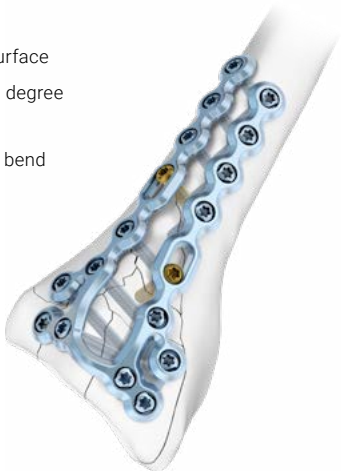
Typical clinical findings

- Intra- and extraarticular fractures
- Procedures where soft tissue conditions do not permit or cause difficulties for a volar approach



Features and benefits

- Low plate profile of 1.6 mm
- Rounded edges and a smooth surface
- Multiple screw holes offer a high degree of intraoperative flexibility
- Anatomical plate design, easy to bend for the desired fit



Clinical Example



Preoperative X-ray



Intraoperative image



Postoperative X-ray

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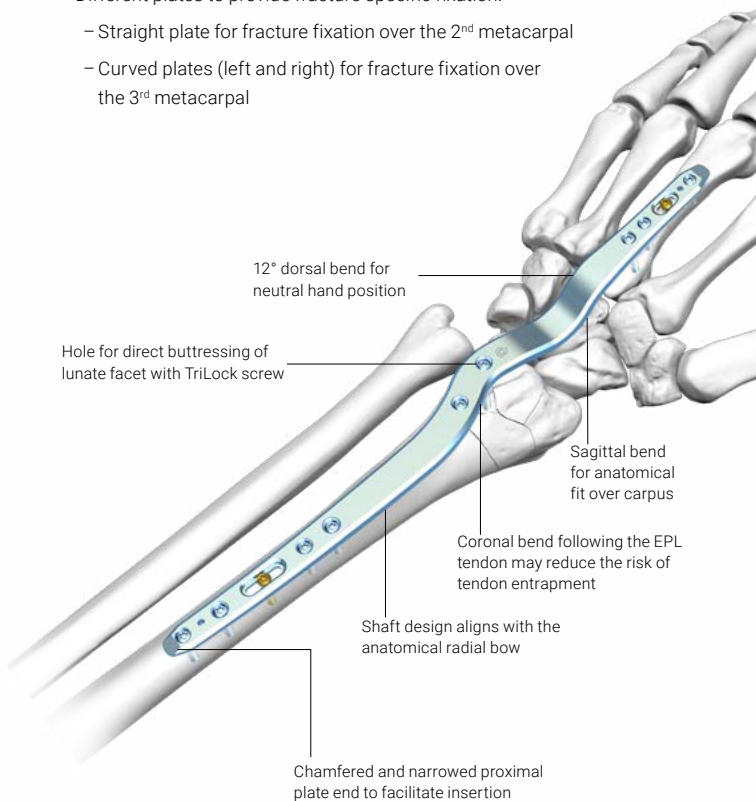
2.5 TriLock Wrist Spanning Plates

Typical clinical findings

- Temporary internal fixation, for example, on highly comminuted distal radius fractures

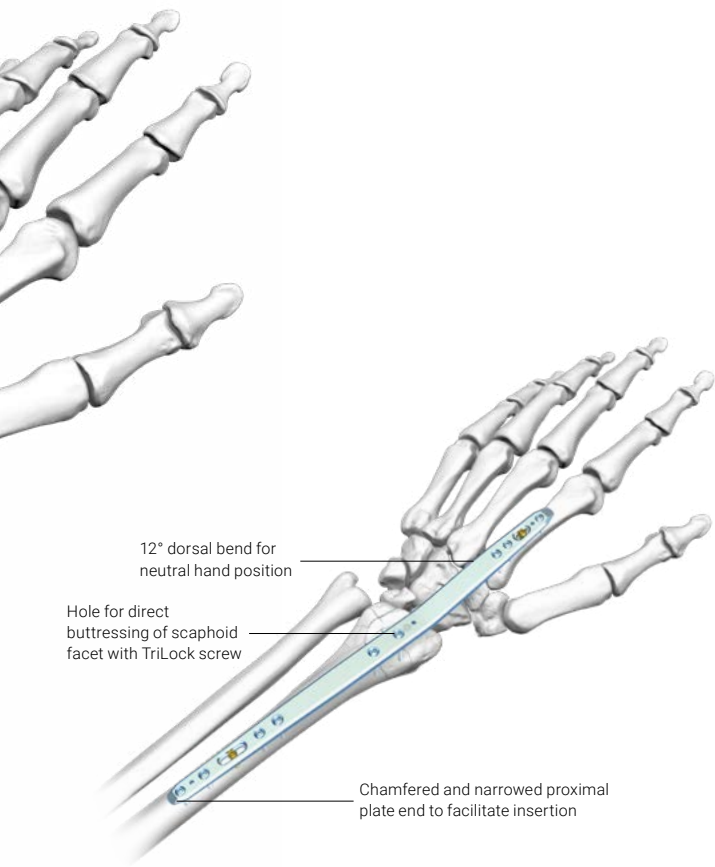
Features and benefits

- Temporary internal fixation utilizes ligamentotaxis to obtain and maintain reduction
- Neutralizes deforming forces across the wrist joint
- No externally exposed hardware
- Anatomical plate design for ease of intraoperative use
- Different plates to provide fracture specific fixation:
 - Straight plate for fracture fixation over the 2nd metacarpal
 - Curved plates (left and right) for fracture fixation over the 3rd metacarpal



*Exception: Oblong holes

2.5 TriLock Wrist Spanning Plates



2.5 TriLock Distal Ulna Plates, Lateral, Volar and Dorsal

Typical clinical findings

- Extraarticular fractures

Features and benefits

- Low plate profile of 1.6 mm
- Plate position can be either lateral (ulnar), volar or dorsal
- Anatomical plate design, easy to bend for the desired fit
- Two plate lengths to address individual fracture patterns



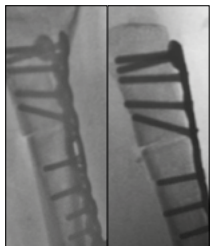
Clinical Example



Preoperative X-ray



Intraoperative image



Postoperative X-ray

Clinical example published with the kind permission of: A. Leti Acciaro, Modena, Italy

2.5 TriLock Distal Ulna Plates

Typical clinical findings

- Complex head fractures

Features and benefits

- Low plate profile of 1.6 mm in the shaft to 1.4 mm distally
- Multiple distal screw fixation options
- Anatomical plate design
- Two plate lengths to address individual fracture patterns



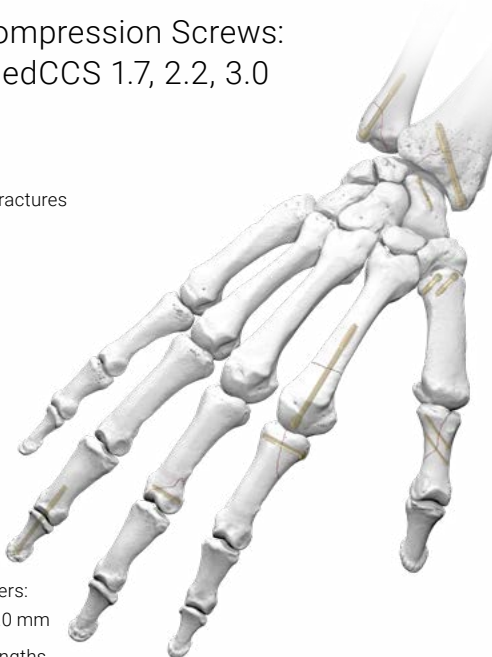
Cannulated Compression Screws: CCS and headed CCS 1.7, 2.2, 3.0

Typical clinical findings

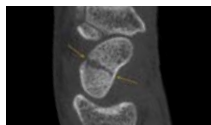
- Head / base / oblique fractures in phalanges
- DIP joint arthritis
- Transverse fracture in metacarpals
- Bennett fracture
- Scaphoid fracture
- Ulnar styloid fracture
- Radial styloid fracture

Features and benefits

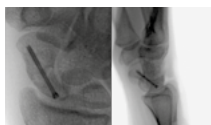
- Three different diameters: 1.7 mm, 2.2 mm and 3.0 mm
- Two different thread lengths
- Headed and headless screws
- Covering numerous areas of use in the hand
- Patented SpeedTip thread design
 - functionally unique cutting with immediate bite ⁴
 - immediate cutting of the bone with only slight axial pressure
- The triangular tip design permits simultaneous drilling, tapping and compression of the bone tissue during insertion for increased pull-out stability ^{5,6}
- Reduced insertion torque thanks to the polygonal tip and tapered shaft



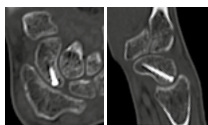
Clinical Examples



Preoperative X-ray



Intraoperative images



Postoperative X-rays

Clinical example published with the kind permission of: N. Schelhorn, R. Fricker, Switzerland

2.5 Ulna Shortening System

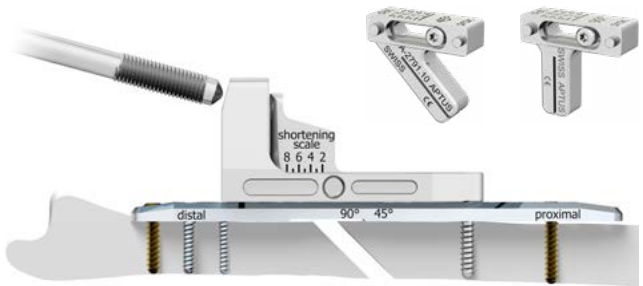
Typical clinical findings

Osteotomies of the ulna, e.g.:

- Ulna impaction syndrome
- Ulna plus variance of > 2 mm, either congenital or acquired, mostly after badly healed distal radius fracture

Features and benefits

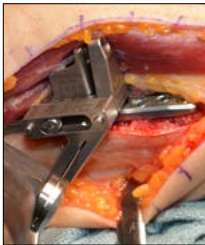
- Rotation-proof and guided compression
- Finely adjustable saw guide (2–8 mm) for precise and parallel osteotomies
- Controlled compression is generated and maintained by means of the spindle
- Recess on the plate allows for osteotomy with fixed plate
- Low plate profile of 3.2 mm



Clinical Example



Preoperative X-ray



Intraoperative image



Postoperative X-ray

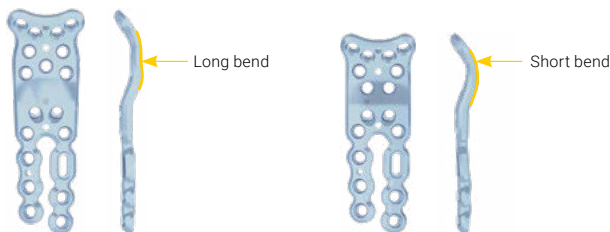
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2.5 TriLock Wrist Fusion Plates

Fusion of radiocarpal and midcarpal joint without arthrodesis of the carpometacarpal joint

Typical clinical findings

- Osteoarthritis of the radiocarpal and midcarpal joint

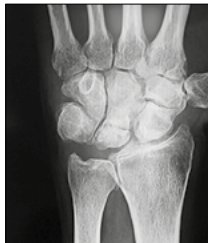


Features and benefits

- Physiological motion in the carpometacarpal joint is maintained
- Plate with long bend, for example for medium to large wrists
- Plate with short bend, for example for small wrists or for arthrodesis following proximal row carpectomy
- Numerous screw holes for angular stable fixation of various carpal bones
- Two preangled screw holes for cortical screws allow for additional fixation of scaphoid and lunate or bone graft
- Double shaft design provides high rotational stability
- Offset screw alignment in the shaft area to avoid screw collisions



Clinical Example



Preoperative X-ray



Intraoperative image



Postoperative X-ray

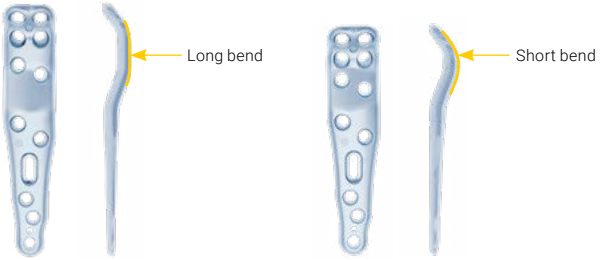
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2.5 TriLock Wrist Fusion Plates

Fusion of the intermediate column – especially following proximal row carpectomy – without arthrodesis of the carpometacarpal joint

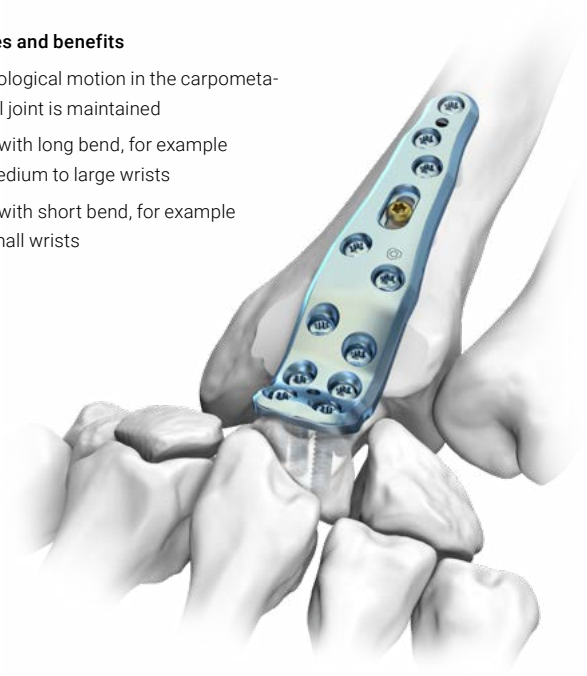
Typical clinical findings

- Osteoarthritis of the radiocarpal joint (radiocapitate)



Features and benefits

- Physiological motion in the carpometacarpal joint is maintained
- Plate with long bend, for example for medium to large wrists
- Plate with short bend, for example for small wrists



2.5 TriLock RSL Fusion Plates, Volar

Radiocarpal arthrodesis from volar

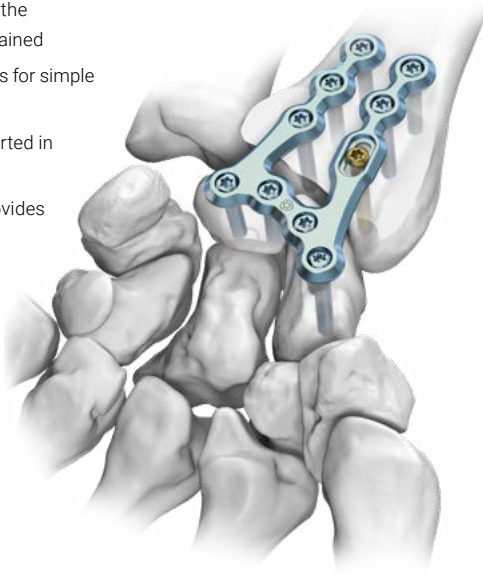
Typical clinical findings

- Degenerative and posttraumatic osteoarthritis of the radiocarpal joint

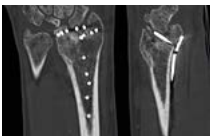


Features and benefits

- Volar plates for fusion of radius, scaphoid and lunate (RSL)
- Physiological motion in the midcarpal joint is maintained
- Anatomical plate designs for simple intraoperative use
- Two screws can be inserted in each carpal bone
- Double shaft design provides high rotational stability
- Low plate profile of 1.6 mm



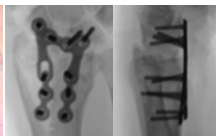
Clinical Example



Failed volar fixation with intraarticular screw position, pronounced joint displacement and SL gap widening



Intraoperative image



Postoperative X-rays

Clinical example published with the kind permission of the author.

2.5 TriLock RSL Fusion Plates, Dorsal

Radiocarpal arthrodesis from dorsal

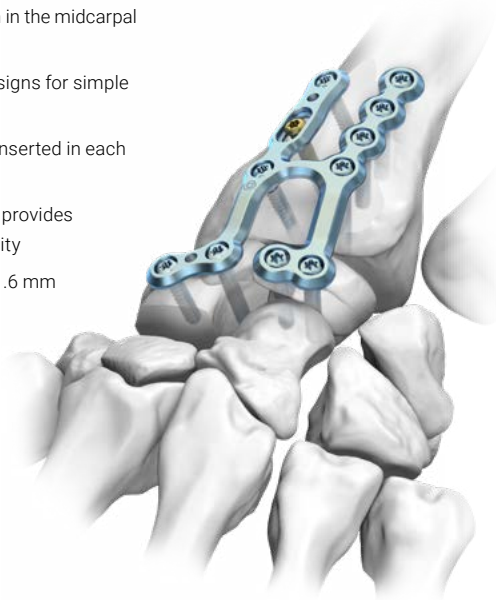
Typical clinical findings

- Degenerative and posttraumatic osteoarthritis of the radiocarpal joint



Features and benefits

- Dorsal plates for fusion of radius, scaphoid and lunate (RSL)
- Physiological motion in the midcarpal joint is maintained
- Anatomical plate designs for simple intraoperative use
- Two screws can be inserted in each carpal bone
- Double shaft design provides high rotational stability
- Low plate profile of 1.6 mm



Clinical Example



Intraoperative X-rays of the arthrodesis with the dorsal RSL fusion plate

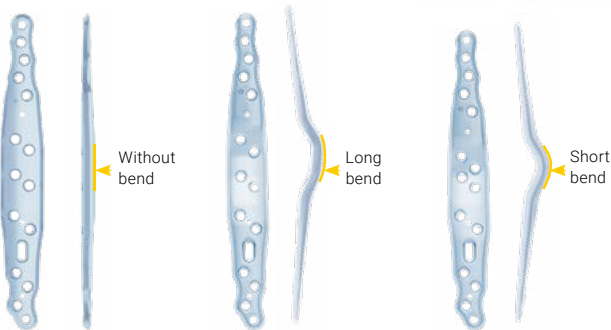
Clinical example published with the kind permission of: Alfons Erdmann, Cologne, Germany

2.5 Total Wrist Fusion Plates

Total wrist arthrodesis

Typical clinical findings

- Osteoarthritis of the radiocarpal, midcarpal and carpometacarpal joint
- Rheumatoid wrist deformities



Features and benefits

- Fusion of radiocarpal, midcarpal and carpometacarpal joint
- Plate with long bend, for example for medium to large wrists
- Plate with short bend, for example for small wrists or for arthrodesis following proximal row carpectomy
- Straight plate for fusion in slight flexion, for example in rheumatoid arthritis
- Offset screw arrangement reduces the risk of axial bone splitting in the metacarpal area
- Multiple screw holes for angular stable fixation of various carpal bones

Clinical Example



Destroyed wrist and ankylosis following synovitis

Intraoperative image

Postoperative X-rays

Clinical example published with the kind permission of: Radek Kebrle, Vysoke, Czech Republic

Instruments and Screws

Instruments

- Simple and easy to use
- Single-handed use
- Consistent and distinct color coding:
system size APTUS 2.5 = purple



Scale 1:2

Screws

- Consistent screw diameter of 2.5 mm for APTUS Wrist 2.5
- 2.5 TriLock and cortical screws in combination with the plate
- Intraoperative adjustability of screw angle and fine-tuning capabilities
- Self-drilling 1.5 SpeedTip screws for rim fragments and bony ligament avulsions (hook plates)



TriLock Screw



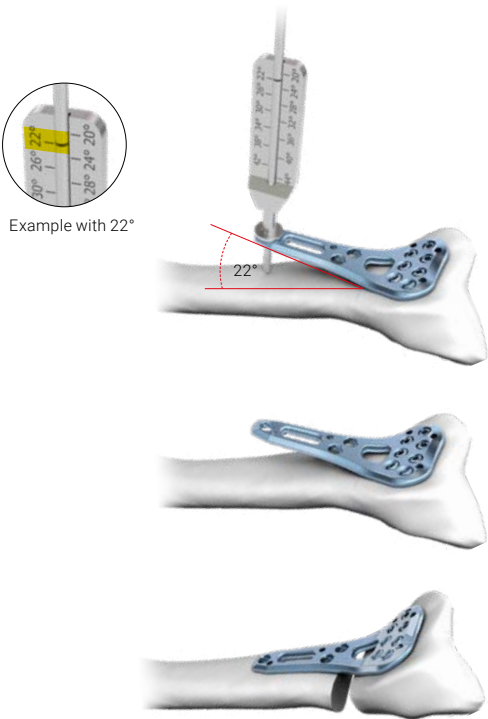
Cortical Screw



SpeedTip Screw

Additional Instruments

Instrument for restoration of the volar tilt



Self-holding drill sleeve



Holding and positioning instrument



Bibliography

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3 Heidemann, W.; Terheyden, H.; Gerlach, K. L.: In-vivo-Untersuchungen zum Schrauben-Knochen-Kontakt von Drill-Free- Schrauben und herkömmlichen selbstschneidenden Schrauben (Mund Kiefer GesichtsChir 5 2001: 17 – 21)

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