

medartis

PRECISION IN FIXATION

# Elbow & Shoulder Product Overview



**APTUS**

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For further information regarding the APTUS product line visit [www.medartis.com](http://www.medartis.com).

# Introduction Medartis

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

Medartis develops and sells titanium screws and plates, surgical instruments, system solutions and patient-specific solutions for fracture fixation in the facial skull and the 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.

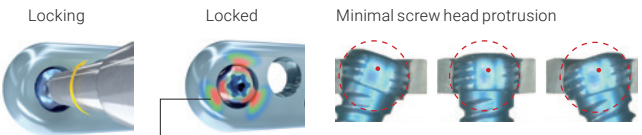
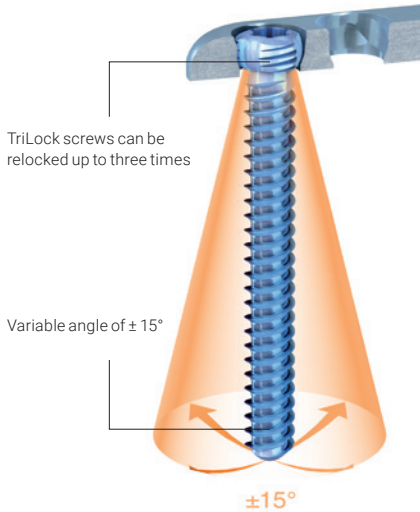
Medartis is represented worldwide through its subsidiaries and a broad distributor network.



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

## TriLock locking technology

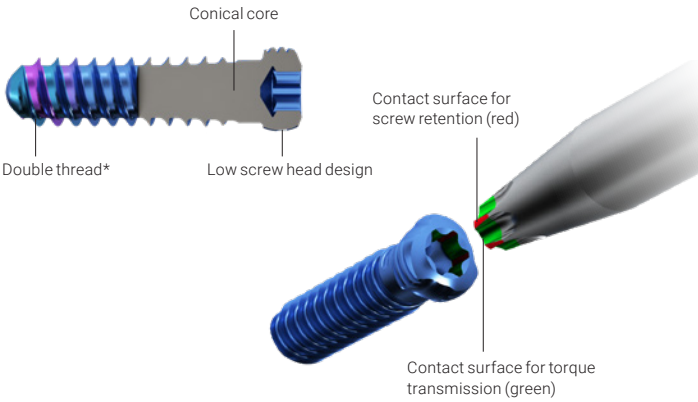
- Patented TriLock locking technology – multidirectional locking of the screw in the plate
- Spherical three-point wedge-locking
- Friction locking through radial bracing of the screw head in the plate without additional tensioning components
- Screws can pivot freely by  $\pm 15^\circ$  in all directions 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



Patented TriLock locking technology – multidirectional locking of the screw in the plate

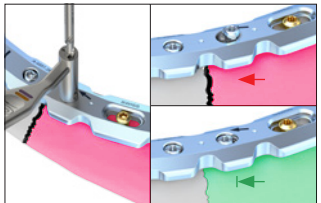
## Screw technology

- Patented HexaDrive screw head design
  - HexaDrive interface with self-holding properties between screw and screwdriver
  - Increased torque transmission
  - Simplified screw pick-up due to patented 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\*



## TriLock<sup>PLUS</sup>

TriLock<sup>PLUS</sup> screw holes offer the advantage of locking and compression in one step



\* does not apply to 2.0 cortical screws

# Comprehensive Solutions for the Elbow and Shoulder

A consistent system for the treatment of fractures and osteotomies in the elbow and shoulder region.

## **Plates**

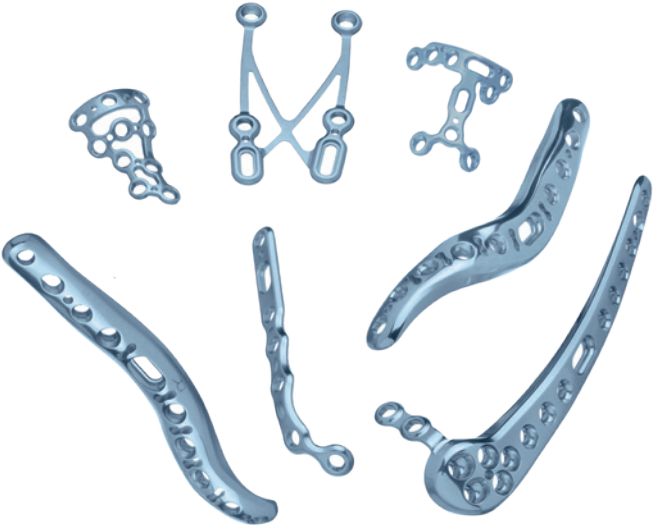
- Anatomical plate designs
- Medartis offers options for the following areas:
  - Radial head
  - Olecranon
  - Coronoid
  - Distal humerus
  - Lateral clavicle
  - Clavicle midshaft
- Low plate profiles with minimal screw head protrusion, rounded edges and a smooth surface for soft tissue protection
- TriLock – multidirectional ( $\pm 15^\circ$ ) and angular stable locking technology in each plate

## **Instrumentation**

- Consistent system size per plate type makes the systems user-friendly, compact and efficient
- Easy to use

# Comprehensive Solutions for the Elbow and Shoulder

## 2.0 and 2.8 Elbow plates



## 2.8 Clavicle plates



# APTUS Elbow 2.0 TriLock Radial Head Plates

## Radial head rim plate

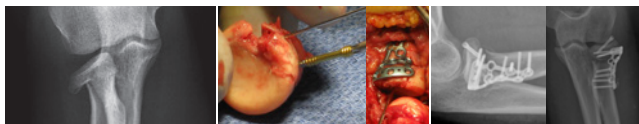
- Positioning close to the rim of the joint surface of the radial head and underneath the annular ligament
- Plate geometry allows for subchondral screw positioning
- Anatomical design facilitates reduction of fragments to the plate



## Clinical benefits

- Reduced soft tissue irritations due to anatomical fit, low plate profile and ease of bending <sup>1</sup>
- Safe and stable treatment of complex multifragment fractures allows for early active mobilization <sup>2,3,4</sup>
- Buttress plate allows positioning outside of the «safe zone» <sup>5,6</sup>

## Clinical Example



Preoperative X-ray

Left: Fragment fixation with  
2.2 SpeedTip CCS  
Right: Fixation of the radial  
head with rim plate

Postoperative X-ray

Clinical example published with the kind permission of: William Geissler, Jackson, MS, USA



# APTUS Elbow 2.0 TriLock Radial Head Plates

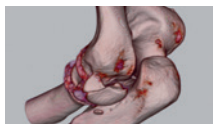
## Radial head buttress plate

- Positioning is distal to the radioulnar joint surface and the annular ligament
- Particularly suitable for fractures with defects in the neck region<sup>3</sup>
- Can be combined with isolated screws for fixation of head fragments



- Grid structure of the plate with offset screw positioning provides rotational stability
- All screw holes can be filled with TriLock or cortical screws
- Screw dimension of 2.0 mm to capture even small fragments
- High number of screw holes

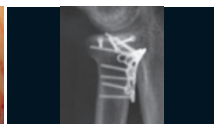
## Clinical Example



Preoperative X-ray



Intraoperative image



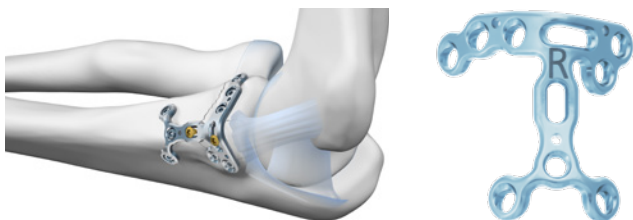
Postoperative X-ray

Clinical example published with the kind permission of: Chr. Eicker, Essen, Germany

# APTUS Elbow

## 2.0 TriLock Coronoid Plate

The 2.0 TriLock coronoid plates were developed for fixation of fractures of the coronoid process and offer an anatomical plate design for left and right.



### Clinical benefits

- Buttressing and fixation of the sublime tubercle to restore elbow stability (indirect refixation of the medial collateral ligament)
- Suitable for the anterior as well as the anteromedial variant of the Hotchkiss approach
- Possibility of subchondral screw placement
- Proximal oblong hole offers increased flexibility for screw positioning and screw angulation

### Clinical Example



Preoperative CT scans of radial head (left) and coronoid (right)

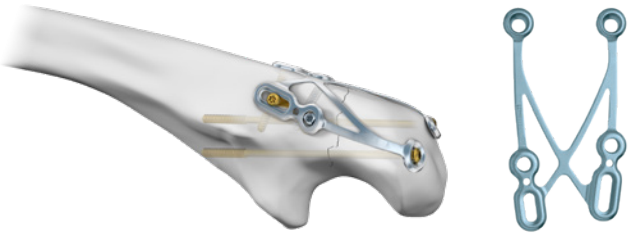
Postoperative X-rays  
Fixation with coronoid plate and radial head buttress plate

Clinical example published with the kind permission of: Lars-Peter Müller, Kilian Wegmann, Cologne, Germany

# APTUS Elbow

## 2.8 TriLock Olecranon Tension Plate

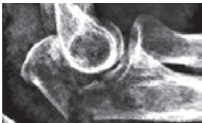
The 2.8 TriLock olecranon tension plate was developed as a replacement of classic tension band wiring. The low-profile plate is very thin entailing limited hardware prominence<sup>7</sup> and can withstand tensile forces.



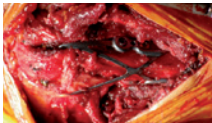
### Clinical benefits

- Two fracture crossing lag screws provide primary compression and fixation
- Uniform and controlled compression of the fracture with lag screws allows for mobilization as early as possible<sup>7</sup>
- Solid anchoring of the tension relief even in osteoporotic bone reduces the risk of fracture dislocation<sup>7</sup>

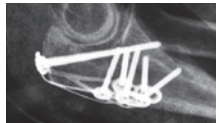
### Clinical Example



Preoperative X-ray



Intraoperative image:  
Olecranon tension  
plate embedded in the triceps  
tendon



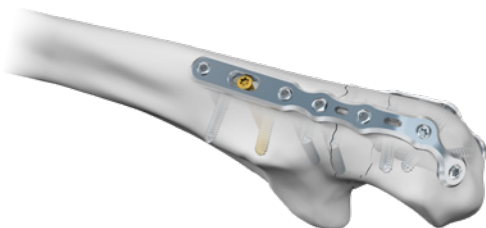
Postoperative X-ray  
(3 months)

Clinical example published with the kind permission of: Séverin Rochet, A. Adam, Laurent Obert, Besançon, France

# APTUS Elbow

## 2.8 TriLock Olecranon Double Plates

### Olecranon double plates, curved



- Particularly suitable for complex proximal fractures
- Fixation with double plates posterolaterally und posteromedially around the olecranon tip

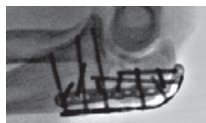
### Clinical benefits

- Low plate profile and high rotational stability due to biomechanically favourable posterolateral and posteromedial plate position
- Plates can be covered with soft tissue (anconeus muscle und flexor carpi ulnaris muscle), thereby reducing the occurrence of wound healing problems and the likelihood of hardware removal<sup>8,9</sup>

## Clinical Example



Preoperative X-ray  
Schatzker type C fracture



Intraoperative X-ray –  
including fixation of the  
coronoid



Intraoperative X-ray of  
crossing screw pattern

Clinical example published with the kind permission of: Chr. Eicker, Essen, Germany

# APTUS Elbow

## 2.8 TriLock Olecranon Double Plates

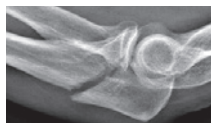
### Olecranon double plates, straight



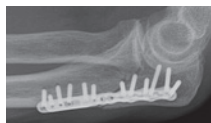
- Particularly suitable for complex distal fractures
- Distal plate position spares the triceps tendon insertion

- High number of screw options enables stable fixation particularly of small proximal fragments<sup>8</sup>
- High primary stability due to screw position orthogonally to the direction of the tension of the triceps brachii muscle<sup>10</sup>
- Easy bending to adapt to the individual anatomy of the patient

### Clinical Example



Preoperative X-ray



Intraoperative lateral X-ray



Intraoperative AP X-ray

Clinical example published with the kind permission of: William Geissler, Jackson, MS, USA

# APTUS Elbow

## 2.8 Distal Humerus Plates

Three plate types are available for the fixation of distal humerus fractures. They allow, especially for complex fractures, pairwise positioning in either a 90° or 180° configuration.

- Three-dimensional plate shapes based on comprehensive anatomical analyses for a good fit to the bone <sup>11</sup>



Medial



Lateral



Posterolateral

### Clinical benefits

- The medial plate has a slight recess in anterior direction which lowers the risk of contact between the ulnar nerve and the plate
- The shape of the lateral plate reduces the necessary soft tissue detachment in the proximal area and may lessen postoperative soft tissue irritations <sup>12</sup>

## Clinical Example

### Multifragment fracture of the distal humerus



Preoperative X-ray of a AO C3 fracture in polytrauma patient



Intraoperative AP X-ray. Distal humerus fracture treated with medial and lateral plate.



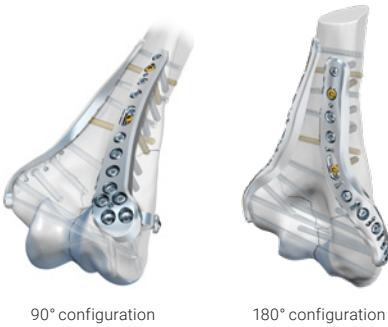
Intraoperative lateral X-ray. Olecranon osteotomy treated with olecranon double plates.

Clinical example published with the kind permission of: Klaus Burkhart, Lars Müller, Cologne, Germany

# APTUS Elbow

## 2.8 Distal Humerus Plates

- Concave milling of the underside of the medial plate reduces its lateral protrusion<sup>11</sup>
- The medial plate has a slight recess in anterior direction on the distal end
- The lateral plate is twisted from distal lateral to proximal posterior
- The posterolateral plate provides additional stability through two transcondylar screws connected via a flap to the plate
- The two most distal screw holes in the posterolateral plate are preangled to capture distal shear fragments of the capitellum



- Plate thickness tapers off at the ends to reduce plate protrusion over the epicondyles
- Proximal screws can be placed bicortically in both the 180° and 90° configuration

## Clinical Example

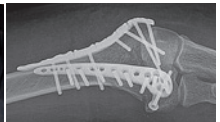
### Supracondylar distal humerus fracture



Preoperative CT scan of supracondylar fracture of type AO A3



Intraoperative image of medial and posterolateral plate



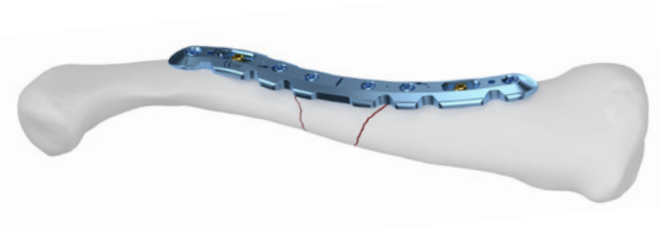
Intraoperative X-ray of medial and posterolateral plate (90° configuration)

Clinical example published with the kind permission of: Michael Forray, Bernd Kinner, Stuttgart, Germany

# APTUS Shoulder Clavicle 2.8

The APTUS Clavicle system offers versatile and anatomical solutions to treat fractures, osteotomies, malunions and non-unions of the clavicle.

## 2.8 TriLock superior, midshaft



### Plate features and clinical benefits

- Anatomical fit developed based on CT data
- 8-hole plates in three bend variations. Straightforward anatomical fit on variously shaped bones with reduced need for plate bending.

## Clinical Example



Preoperative X-ray of a midshaft fracture with a bending wedge AO/OTA type 15.2 B

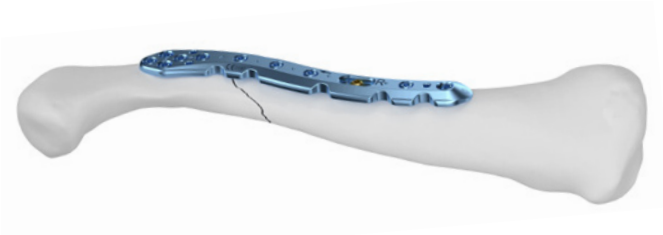


Postoperative X-ray of fixation with a superior midshaft plate and an isolated lag screw

Clinical example published with the kind permission of: Haren Nandapalan, Sydney, Australia



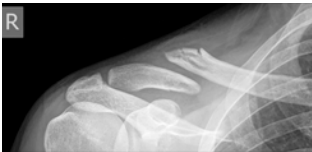
## 2.8 TriLock superior, lateral shaft



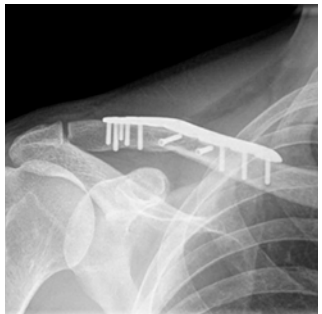
### Plate features and clinical benefits

- Specific anatomical fit offers the possibility to position the plate laterally, but away from the AC joint
- Multiple options for screw placement to increase pull-out strength in the lateral area
- Narrowed lateral plate end with reduced plate thickness
- Preangled screw hole in the medial plate end

## Clinical Example



Preoperative X-rays of a lateral fracture Neer type IIa

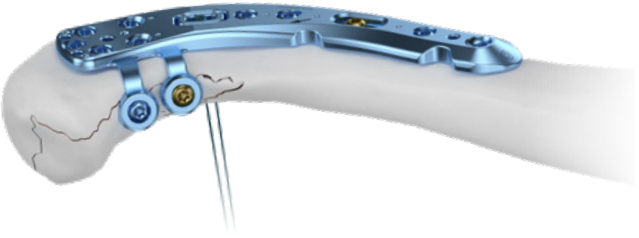


Postoperative X-ray of fixation with superior lateral shaft plate and two isolated lag screws

Clinical example published with the kind permission of: Andrew C. Wright, Wrightington, UK

# APTUS Shoulder Clavicle 2.8

## 2.8 TriLock superior, lateral



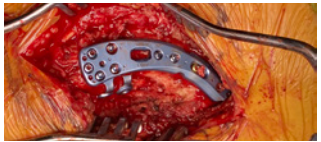
### Plate features and clinical benefits

- Two flaps for screws from anterior to posterior allow for screw placement in two planes and enhance the possibilities to address fragments
- Multiple screw holes and increased pull-out strength in the lateral area for various fracture patterns
- Plate slot to hold an insert offers the possibility to fix a suture through the plate or alternatively to place a cortical screw
- The optional drill guide block facilitates rapid and accurate screw insertion at a predefined angle

## Clinical Example



Lateral clavicle fracture Neer type IIb



Intraoperative view of superior lateral clavicle plate with superior and anterior screw fixation laterally, without need for coracoclavicular fixation

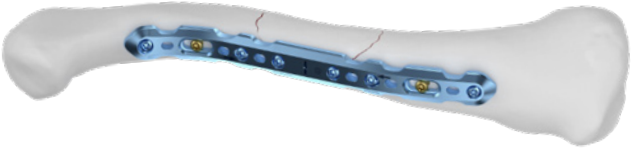


Postoperative X-ray

Clinical example published with the kind permission of: Eugen Ek, Melbourne, Australia

# APTUS Shoulder Clavicle 2.8

## 2.8 TriLock anterior



### Plate features and clinical benefits

- Chamfered and narrowed plate ends with preangled screw holes
- Designed for less invasive plate placement and fixation method
- Low plate profile with minimal screw head protrusion, rounded edges and a smooth surface for soft tissue protection

## Clinical Example



Preoperative X-ray of a simple oblique midshaft fracture AO/OTA type 15.2 A



Postoperative X-rays of fixation with an anterior midshaft plate and an isolated cortical lag screw

# APTUS Elbow & Shoulder Instrumentation, Screws

## Instrumentation

- Simple and reduced instrumentation
- Consistent and clear color coding of the system sizes

| System size | Color code |
|-------------|------------|
|-------------|------------|

|           |      |
|-----------|------|
| APTUS 2.0 | Blue |
|-----------|------|

|           |        |
|-----------|--------|
| APTUS 2.8 | Orange |
|-----------|--------|



## Screws

Consistent screw diameters per plate type:

|                       |        |
|-----------------------|--------|
| Radial head plates    | 2.0 mm |
| Coronoid plates       | 2.0 mm |
| Olecranon plates      | 2.8 mm |
| Distal humerus plates | 2.8 mm |
| Clavicle plates       | 2.8 mm |

- TriLock locking screws and cortical screws for combination with the plates
- Lag screws with diameter 2.8 mm are available for olecranon plates and distal humerus plates



TriLock screw



Cortical screw



Lag screw

# APTUS Elbow & Shoulder Additional Instrumentation

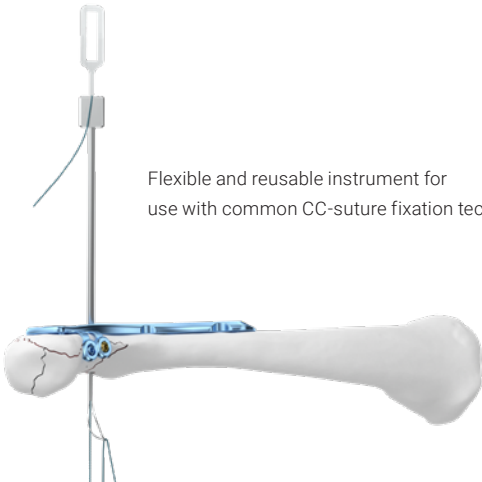
## Aiming device for distal humerus

- Assists with the insertion of transcondylar screws through defined drill channel
- Drill stop shortly before the exit point
- Screw length is read directly at the aiming device



## Nitinol suture retriever for the clavicle

Flexible and reusable instrument for use with common CC-suture fixation techniques



- 1 K. J. Burkhart, T. E. Nowak, Y.-J. Kim, P. M. Rommens, L. P. Müller, «Anatomic Fit of Six Different Radial Head Plates: Comparison of Precontoured Low-Profile Radial Head Plates», *Journal of Hand Surgery*, 2011, 36A:617-624
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- 3 K. J. Burkhart, D. Gruszka, S. Frohn, K. Wegmann, P. M. Rommens, L. P. Müller, «Winkelstabile Plattenosteosynthese des Radiuskopfes. Klinische und radiologische Ergebnisse», *Unfallchirurg*, 2015, 118(11): P949-56
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- 6 C. Ries, M. Müller, K. Wegmann, D. B. Pfau, L.P. Müller, K.J. Burkhart, «Is an extension of the safe zone possible without jeopardizing the proximal radioulnar joint when performing a radial head plate osteosynthesis?», *J Shoulder Elbow Surg*, 2015, 24; P1627-1634
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- 9 Ellwein, K. Argiropoulos, R.-O. DeyHazra, M.-F. Pastor, T. Smith, H. Lill «Clinical evaluation of double-plate osteosynthesis for olecranonfractures: A retrospective case-control study» *Orthopaedics & Traumatology: Surgery & Research*, 2019, 105 (8); 1601-1606
- 10 C. Ries · K. Wegmann · R.H. Meffert · L.P. Müller · K.J. Burkhart, «Die Doppelplattenosteosynthese der proximalen Ulna», *Oper Orthop Traumatol*, 2015, 27(4); P342-356
- 11 K. Wegmann, K.J. Burkhart, J. Zimmermann, J. Dargel, S. Nijs, M.A. Konerding, L.P. Müller, «The interference of distal humeral plating with the medial and lateral collateral ligaments of the elbow», *Arch Orthop Trauma Surg*, 2014, 134; P501-507
- 12 M. Crönlein, M. IUCKE, M. Beirer, F.B. Imhoff, D. Pförringer, C. Kirchhoff, P. Biberthaler, K.F. Braun, S. Siebenlist, «Polyaxial locking plates in treating distal humeral fractures: a comparative randomized trial for clinical outcome», *BMC Musculoskeletal Disorders*, 2017. 18:547

# Loan Service, Contact Addresses

## Loan Service

The APTUS Elbow & Shoulder systems are also available as a loan set.

- 24 hrs service (Monday–Friday)
- Order today for delivery on the next working day
- Collection directly from the user in the surgical department

## Contact Addresses

Our sales representatives will be pleased to advise you personally on our APTUS products. You can obtain further information at the following addresses or at [www.medartis.com](http://www.medartis.com).

|  |  |
|--|--|
| <b>Medartis Headquarters<br/>Switzerland</b> | Phone: +41 (0)61 633 34 34<br>Fax: +41 (0)61 633 34 00<br>Email: <a href="mailto:order@medartis.com">order@medartis.com</a>  |
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| <b>France</b>                                | Phone: +33 (0) 4 74 99 94 14<br>Fax: +33 (0) 4 74 99 00 19<br>Email: <a href="mailto:commandes-fr@medartis.com">commandes-fr@medartis.com</a>  |
| <b>Germany</b>                               | Phone: +49 (0) 7665 98 24 299 (loan service)<br>Phone: +49 (0) 7665 98 24 0<br>Fax: +49 (0) 7665 98 24 10<br>Email: <a href="mailto:orders_de@medartis.com">orders_de@medartis.com</a> |
| <b>Japan</b>                                 | Phone: +81 3 4520 5048<br>Fax: +81 50 3737 5397<br>Email: <a href="mailto:orders_jp@medartis.com">orders_jp@medartis.com</a>   |
| <b>Mexico</b>                                | Phone: (+52) 55 6388 7063<br>Email: <a href="mailto:servicioclientes@medartis.com">servicioclientes@medartis.com</a>   |
| <b>New Zealand</b>                           | Phone: 0800 548 001 / +64 (9) 909 0416<br>Fax: +0800 548 002 / +64 9 909 0419<br>Email: <a href="mailto:bookings@medartis.com">bookings@medartis.com</a>                               |
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