medartis®

PRECISION IN FIXATION

SURGICAL TECHNIQUE – STEP BY STEP

Distal Radius / Distal Ulna 2.5

APTUS® Wrist

LITERATURE

1. Krimmer, H., Pessenlehner, C., Haßelbacher, K., Meier, M., Roth, F., and Meier, R.
   Palmar fixed angle plating systems for instable distal radius fractures
   [Palmare winkelstabile Plattenosteosynthese der instabilen distalen Radiusfraktur]
   Unfallchirurg, 107[6], 460-467. 2004.

2. Mehling, I., Meier, M., Schloer, U., and Krimmer, H.
   Multidirectional Palmar Fixed-Angle Plate Fixation for Unstable Distal Radius Fracture
   [Multidirektionale winkelstabile Versorgung der instabilen distalen Radiusfraktur]
   Handchir.Mikrochir.Plast.Chir, 39[1], 29-33. 2007.

3. Moser, V. L., Pessenlehner, C., Meier, M., and Krimmer, H.
   Anterior Fixed Angle Plate Fixation of Unstable Distal Radius Fractures
   [Palmare winkelstabile Plattenosteosynthese der instabilen distalen Radiusfraktur]
   Operat.Orthop.Traumatol., 16[4], 380-396. 2004.

4. Jakubietz, R. G., Gruenert, J. G., Kloss, D. F., Schindele, S., and Jakubietz, M. G.
   A Randomised Clinical Study Comparing Palmar and Dorsal Fixed-Angle Plates
   for the Internal Fixation of AO C-Type Fractures of the Distal Radius in the Elderly
   Journal of Hand Surgery, European Volume 33[5], 600-604. 2008.

5. Figl, M., Weninger, P., Liska, M., Hofbauer, M., and Leixnering, M.
   Volar fixed-angle plate osteosynthesis of unstable distal radius fractures: 12 months results
   Arch.Orthop.Trauma Surg., 129[5], 661-669. 2009.

6. Weninger, P., Schueller, M., Drobetz, H., Jamek, M., Redl, H., and Tschegg, E.
   Influence of an Additional Locking Screw on Fracture Reduction After Volar Fixed-Angle Plating –
   Introduction of the "Protection Screw" in an Extra-Articular Distal Radius Fracture Model
   Journal of Trauma - Injury, Infection, and Critical Care, 67[4], 746-751. 2009.

7. Figl, M., Weninger, P., Jurkowitsch, J., Hofbauer, M., Schauer, J., and Leixnering, M.
   Unstable Distal Radius Fractures in the Elderly Patient – Volar Fixed-Angle Plate Osteosynthesis
   Prevents Secondary Loss of Reduction
   Journal of Trauma - Injury, Infection, and Critical Care, 68[4], 992-998. 2010.

8. Sonderegger, J., Schindele, S., Rau, M., and Gruenert, J. G.
   Palmar multidirectional fixed-angle plate fixation in distal radius fractures:
   do intraarticular fractures have a worse outcome than extraarticular fractures?
   Arch.Orthop.Trauma Surg., 2010.

9. Richter, R., Konnl, E., and Krimmer, H.
   Strategy of early corrective osteotomy
   [Strategie der Radiusfrühkorrektur]
   Obere Extremität, 5[2], 92-97. 2010.

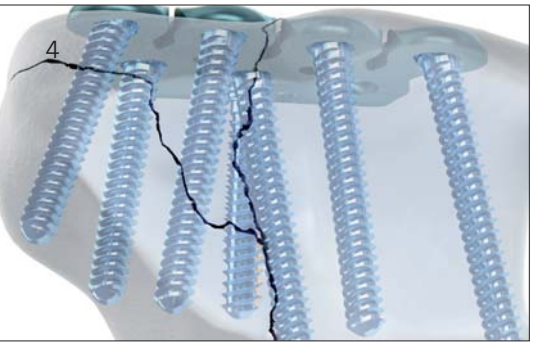
10. Haefeli, M., Stober, R., Plaass, C., Jenzer, A., and Steiger, R.
    First experience with a dorsal plate in modern design for the treatment of distal radius fractures
    Journal of Hand Surgery, European Volume 35E[S1], A-0461. 2010.

Distal Radius / Distal Ulna 2.5

CONTENTS

Features, Technique

Combination is the Solution



1 ADAPTIVE TriLock distal radius plates in the module
2 Detail TriLock screws
3 Detail ADAPTIVE TriLock plate
4 Detail radius bone model with TriLock fracture plate
5 Detail drill guide block

For further information on the plate range, see the APTUS Ordering Catalog at www.medartis.com/meta/downloads/marketing-materials.

→ www.medartis.com/products/aptus/wrist

- Multidirectional (±15°) and angular stable TriLock locking technology
- Anatomic plate designs
- HexaDrive interface with excellent self-holding properties

TECHNOLOGY

- Multidirectional (±15°) and angular stable TriLock locking system
  - o Spherical three-point wedge-locking
  - o Friction locking through radial bracing of the screw head in the plate – without additional tensioning components
- TriLock screws can be re-locked in the same plate hole under individual angles up to three times
- Minimal screw head protrusion thanks to internal locking contour
- No cold welding between plate and screws
- Intra-operative fine tuning capabilities

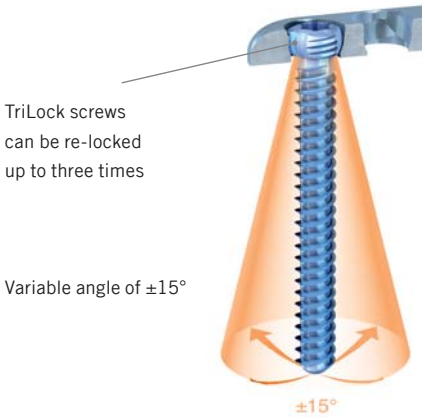
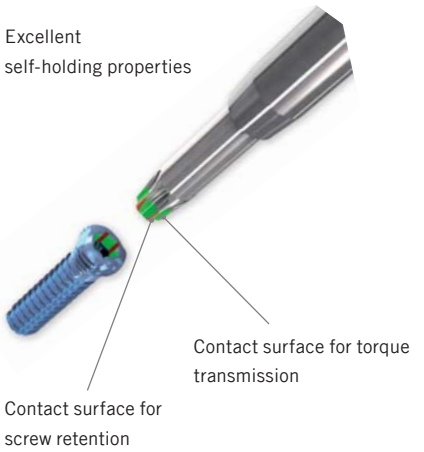


PLATE FEATURES

- Anatomically pre-shaped and fracture specific implant designs for easy intra-operative application
- Low overall profile height and chamfered plate contour to minimize soft-tissue irritation
- Optimal subchondral stability due to double-row screw arrangement in the distal area of the radius plates
- Uniform screw diameter of 2.5 mm for intra-operative simplicity

SCREW FEATURES

- HexaDrive – the optimal self-retaining mechanism between screw and screwdriver for increased torque transmission
- Precision cut thread profile for improved sharpness and self-tapping properties



→ www.medartis.com/products/aptus/wrist

General Instrument Application

INTRODUCTION

Flexibility and stability for optimal and fast regeneration
APTUS Wrist products promote anatomically correct reconstruction of the bone, while focusing on early functional stability. The unique TriLock locking technology stabilizes complex and intraarticular fractures by means of the internal fixator principle. With the option of multidirectional screw positioning, individual fragments are fixated angularly stable and ensure perfect anatomical reconstruction. The stability of the entire construct and the innovative locking technology significantly reduce implant size, allowing the patient considerably more mobility during subsequent therapy.

PRODUCT MATERIALS

All APTUS implants are made from pure titanium (ASTM F67, ISO 5832-2) or from titanium alloy (ASTM F136, ISO 5832-3). All of the titanium materials used are biocompatible, corrosionresistant and non-toxic in a biological environment. Instruments consist of stainless steel, PEEK or aluminum.

INDICATIONS

- For fractures, osteotomies and pseudarthrosis at the distal radius
- For fractures and osteotomies at the distal ulna

CONTRAINDICATIONS

- Pre-existing or suspected infections at or near the implantation site
- Known allergies and/or hypersensitivity to foreign bodies
- Inferior or insufficient bone quality to securely anchor the implant
- Patients who are incapacitated and/or uncooperative during the treatment phase
- The treatment of at-risk groups is inadvisable

COLOR CODING

System	Color Code
APTUS 2.5	violet

Plates and Screws
Special implant plates and screws have their own color:

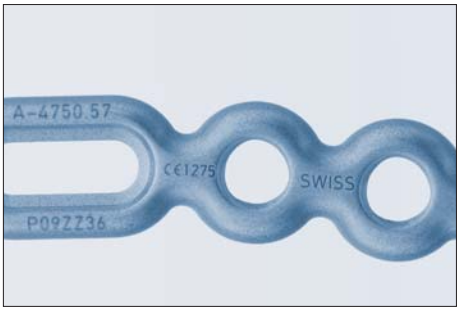
Blue implant plates:	TriLock plates (locking)
Gold implant screws:	Cortical screws (fixation)
Blue implant screws:	TriLock screws (locking)
Silver implant screws:	TriLock Express screws (locking)

BENDING

If required, bend TriLock volar fracture plates, volar frame plates, dorsal radius plates, small fragment plates and distal ulna plates using the plate bending pliers A-2047. The plate bending pliers have two different pins to protect the locking holes of flat and curved plates during the bending process.

A-2047
2.0-2.8 Plate Bending Pliers, with Pins

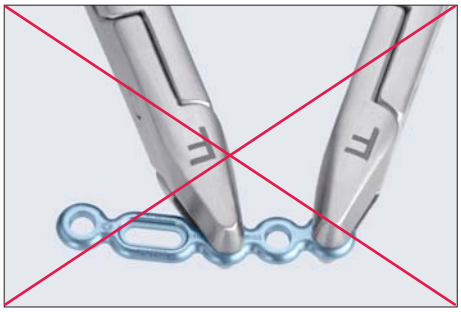
The labeled side of the plate must always face upwards when inserting the plate into the bending pliers.

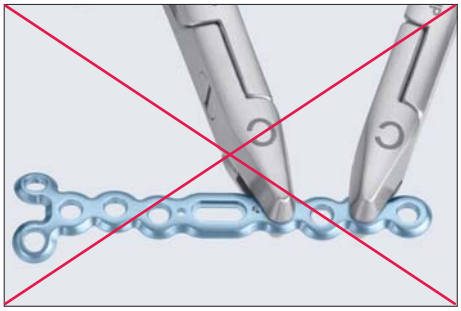


When bending a flat plate (distal radius plates), the plate bending pliers must be held so that the letters "F – FLAT PLATE THIS SIDE UP" are legible from above.

When bending a curved plate (distal ulna plates), the letters "C – CURVED PLATE THIS SIDE UP" must be legible from above. This ensures that the plate holes are not damaged.

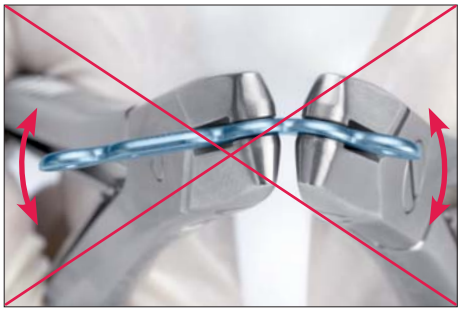
While bending, the plate must always be held at 2 adjacent holes to prevent contour deformation of the intermediate plate hole (refer to figures).





Do not bend the plate by more than 30°. Bending the plate further may deform the plate holes and may cause the plate to break postoperatively.

Note:
Repeated bending of the plate in opposite directions may cause the plate to break postoperatively. Always use the provided plate bending pliers to avoid damaging the plate holes. Damaged plate holes prevent correct and secure seating of the screw in the plate and increase the risk of system failure.



CUTTING

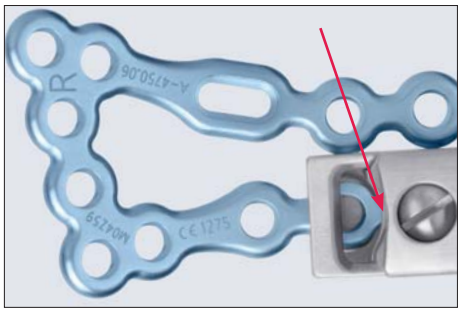
If required, the plate cutting pliers A-2046 can be used to cut the TriLock small fragment plates, volar frame plates, dorsal radius plates as well as K-wires up to a diameter of 1.8 mm.

A-2046
1.2-2.8 Plate Cutting Pliers

Ensure that there are no remaining plate segments in the cutting pliers (visual check). Insert the plate from the front into the open cutting pliers. Always ensure that the labeled side of the plate is facing upwards. Hold the implantable plate segment with your hand during and after cutting.

Tip:
To facilitate the insertion of the plate, support the cutting pliers slightly with your middle finger.

You can visually check the desired cutting line through the cutting window in the head of the pliers (see figure). Always leave enough material on the rest of the plate to keep the adjacent hole intact. Always cut the plate holes individually. If two plate holes need to be cut off, two cutting procedures are necessary.



Shorten the K-wires by inserting the wire through the opening located on the side of the plate cutting pliers. Cut the wire by pressing the pliers.

DRILLING

All twist drills are color-coded via a ring system (system size 2.5 = violet). There are two different types of twist drills available: one for core holes and one for gliding holes (lag screw technique).

Core Hole Drills = one colored ring

The twist drill must always be guided by the drill guide A-2722 to prevent damaging the plate hole and to protect surrounding tissue from direct contact with the drill. The drill guide also serves to limit the drilling angle.

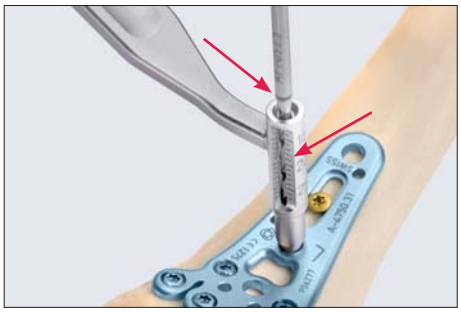
Gliding Hole Drills = two colored rings

The double-sided drill guide for lag screws A-2721 is used to perform the classical lag screw technique according to AO/ASIF.

A-2721
2.5 Drill Guide for Lag Screws

A-2722
2.5 Drill Guide, scaled

After positioning the plate, insert the drill guide A-2722 and the twist drill into the plate hole. In the APTUS system, the drill is guided by the drill shaft and not the drill flute.



You can read the required screw length at the scale of drill guide A-2722 in connection with the black markings on the drill shaft of twist drills A-3713, A-3723 and A-3733.

Note:
For TriLock plates ensure that the screw holes are pre-drilled with a pivoting angle of no more than ±15°. For this purpose the drill guides show a limit stop of ±15°. A pre-drilled pivoting angle of >15° prevents the TriLock screws from correctly locking into the plate.

→ www.medartis.com/products/aptus/wrist

Drill Guide Block

The drill guide block serves to rapidly and accurately position the screws in connection with the ADAPTIVE TriLock plates. The drill guide block is adapted to the distal area of the ADAPTIVE plates A-4750.61-64. There is no danger of drilling channels crossing during the drilling process.

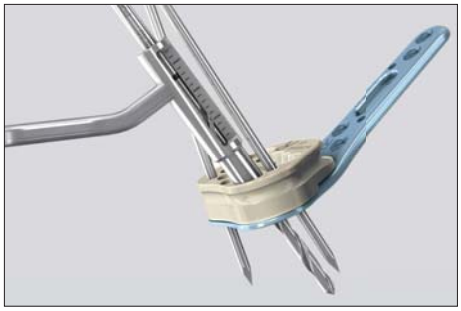
left

A-2723.01

right

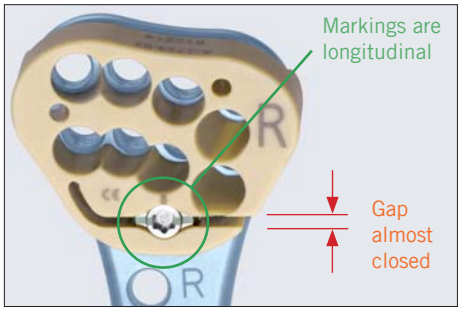
A-2723.02

The drill guide A-2722, the depth gauge A-2730 as well as two K-wires with a diameter of up to 1.6 mm can be used together with the drill guide block. You can drill, measure and insert the screws through the holes of the attached drill guide block.

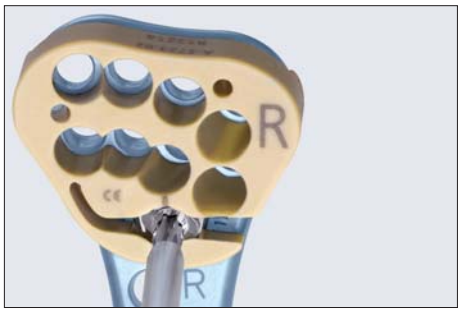


Fixating and detaching the drill guide block

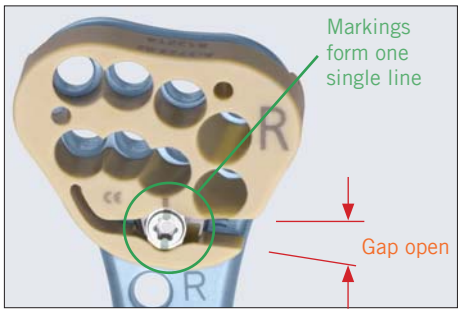
The drill guide block is clicked onto the plate, while markings of the drill guide block and rotating element are longitudinal.



Use the screwdriver A-2710 to turn the rotating element anchored in the drill guide block by a quarter rotation in a clockwise or counter-clockwise direction, until the drill guide block expands and is firmly locked with the plate.



The line on the drill guide block and the line on the rotating element will form a single line.



After all screws have been fixed in the distal area of the plate, you can remove the drill guide block in reverse sequence.

Surgical Technique Lag Screws

1. Drilling the gliding hole

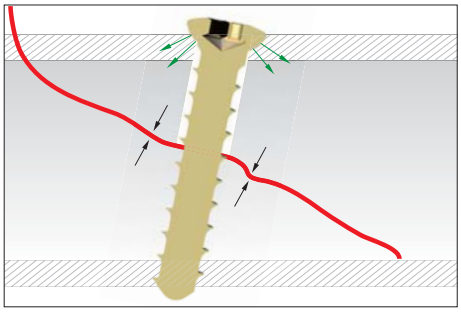
Use the twist drill for gliding holes (two violet rings) to drill the gliding hole (Ø 2.6 mm) through the end of the drill guide A-2721 (two violet markings).

2. Drilling the core hole

Insert the end of the drill guide (one violet marking) into the gliding hole and use the twist drill for core holes (one violet ring) to drill the core hole (Ø 2.0 mm).

3. Compressing the fracture

Compress the fracture with the corresponding cortical screw.

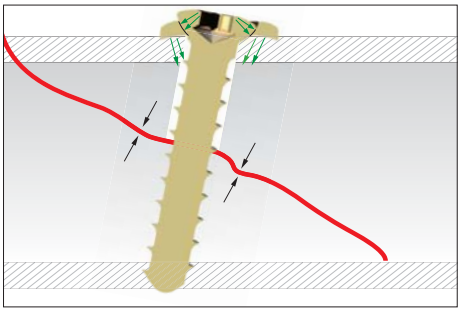


4. Optional steps before compression

If required, use the countersink A-3830 to create a recess for the screw head.

We recommend: Use the handle A-2070 instead of a power drive.

For improved stress distribution in soft or osteoporotic bone, use a biconcave washer A-4750.70.

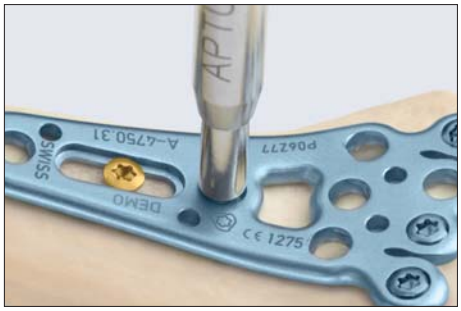


DEPTH MEASURING

The depth gauge A-2730 is used to determine the optimal screw length for monocortical or bicortical screw fixation.

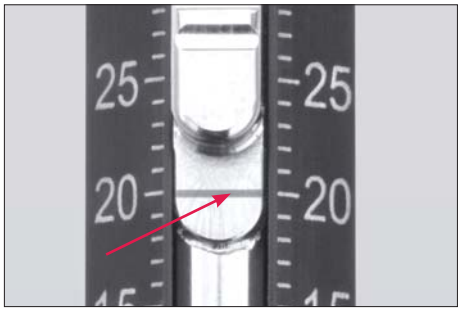
A-2730
2.5 Depth Gauge

To measure, place the tip of the depth gauge onto the implant plate or directly onto the bone.



The caliper of the depth gauge has a hooked tip that is either inserted to the bottom of the hole or is used to catch the far cortex of the bone to determine the correct screw length. The caliper remains static and only the slider is adjusted.

A scale on the depth gauge shows the ideal screw length for the measured drill hole.



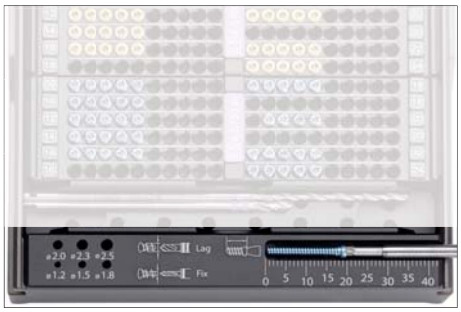
SCREW PICK-UP

The screwdriver A-2710 features the patented HexaDrive self-holding system.

A-2710
2.5 Screwdriver, self-holding, HD7

To remove the screws from the implant container, vertically insert the screwdriver into the screw head of the desired screw and pick up the screw with axial pressure.
Note: The screw will not hold without axial pressure!
Vertically extract the screw from the compartment. The screw is held securely by the blade.

Check the screw length and diameter at the scale of the measuring module. The screw is measured at its head.



DISTAL TWO-ROW SCREW ALLOCATION

During application at the distal radius ensure that screws are inserted in two rows at the distal end of the plate. This not only increases stability but also provides the best possible subchondral support of the radiocarpal joint. Drill the two distal screw rows as subchondrally as possible, which automatically leads to the screws crossing over.

We recommend inserting at least 3 TriLock screws into the most distal row and 2 TriLock screws into the second distal row.

For a stable fixation of distal ulna fractures, ensure that at least 3 TriLock screws are set distally to the fracture line and at least 2 proximally. Distally angling the screw from the second distal row permits optimal subchondral support of the ulnar head.

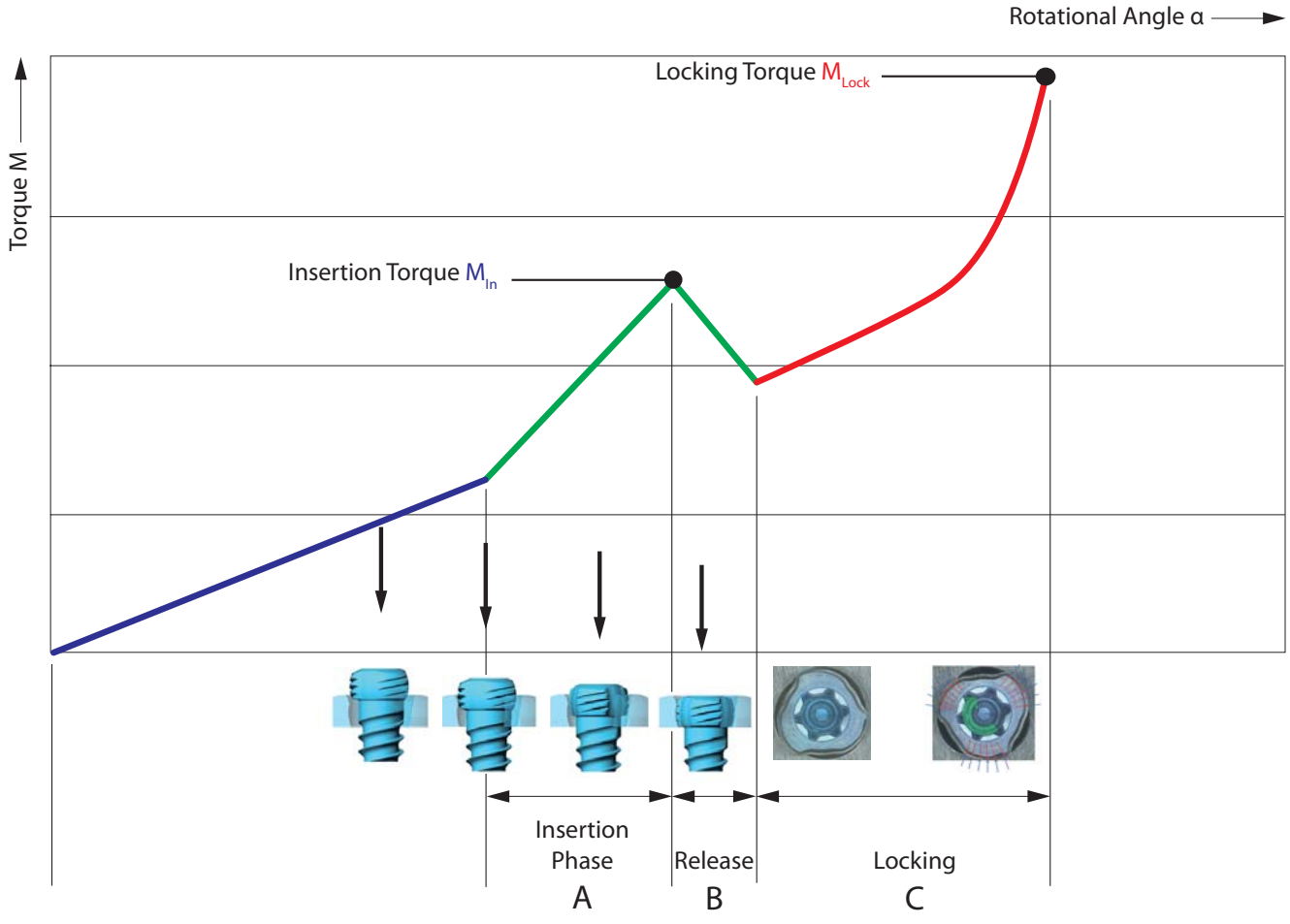
→ www.medartis.com/products/aptus/wrist

CORRECT APPLICATION OF THE TRILOCK LOCKING TECHNOLOGY

The screw is inserted through the plate hole into a pre-drilled canal in the bone. An increase of the tightening torque will be felt as soon as the screw head gets in contact with the plate surface.

This indicates the start of the "Insertion Phase" as the screw head starts entering the locking zone of the plate (section "A" in the diagram). Afterwards, a drop of the tightening torque occurs (section "B" in the diagram). Finally the actual locking is initiated (section "C" in the diagram) as a friction connection is established between screw and plate when tightening firmly.

The torque applied during fastening of the screw is decisive for the quality of the locking as described in section "C" of the diagram.



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CORRECT LOCKING (±15°) OF THE TRILOCK SCREWS IN THE PLATE

Visual inspection of the screw head projection provides an indicator of correct locking. Correct locking has occurred only when the screw head has locked flush with the plate surface (figures 1+3). However, if the screw head can still be seen or felt (figures 2+4), the screw head has not completely entered the plate and reached the locking position. In this case the screw has to be retightened to obtain full penetration and proper locking.

Do not overtighten the screw, otherwise the locking function cannot be guaranteed anymore.

Correct: LOCKED

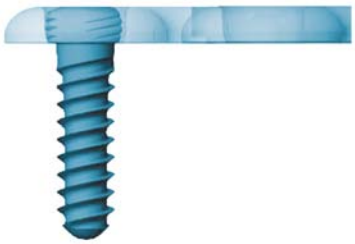

Figure 1

Incorrect: UNLOCKED

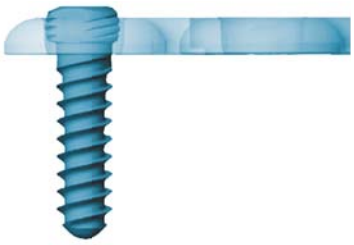

Figure 2

Correct: LOCKED

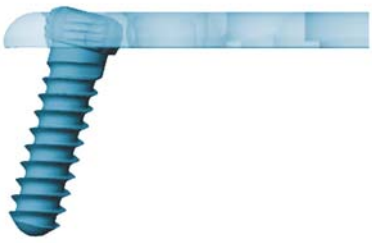

Figure 3

Incorrect: UNLOCKED

Figure 4

HEADQUARTERS

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