

medartis®

PRECISION IN FIXATION

INFORMATION ON THE PRODUCT RANGE

Hand



APTUS®

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Evolution of the internal fixation of long bone fractures. The scientific basis of biological internal fixation: choosing a new balance between stability and biology
J Bone Joint Surg Br. 2002;84(8):1093-110.
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APTUS® Hand

Introduction

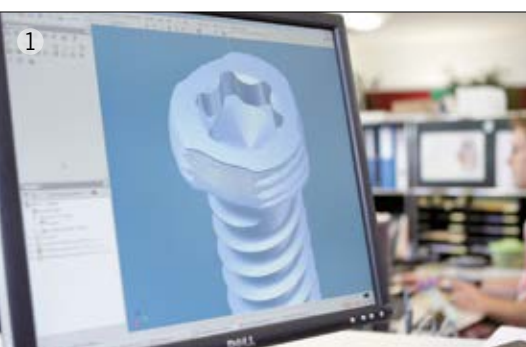
Injuries and skeletal diseases represent a challenge to modern hand surgery. The anatomically complex bone and joint structures, as well as soft tissue in confined spaces, require a high degree of skill and precision to reconstruct and restore function. In this regard, new biomechanically improved implants, in combination with appropriately matched instruments, facilitate daily work and contribute to reliable rehabilitation and preservation of function.

In collaboration with leading specialists, Medartis has developed the unique APTUS Hand fixation system for fracture treatment and reconstructive surgery. The different plate designs are adapted to the anatomy of the hand skeleton. A reduced profile height and an optimized implant surface offer protection to the soft tissues. With the TriLock locking technology, complex and intra-articular fractures are stabilized by means of the internal fixator principle. The improved biomechanical characteristics of the implants permit early mobilization and active therapy.

With the introduction of APTUS Hand, Medartis has been able to offer a considerable contribution toward expanding the therapeutic diversity for treatment of fractures of the phalanges and metacarpals as well as of arthrodesis.

With TriLock, Medartis was the first company to offer a fully modular, multidirectional and angular stable hand fixation system – an innovation that has become state-of-the-art in hand surgery.

Precision in Fixation



- 1 3D image of a TriLock screw
- 2 Medartis headquarters in Basel
- 3 Screw production
- 4 TriLock demo model, scale 10:1
- 5 Quality inspection

Medartis AG, headquartered in Basel, Switzerland, specializes in technical high-precision implants 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 skull and the extremities. These implants allow for patient rehabilitation after surgical reconstruction of fractures, malunions and deformities or skeletal diseases and their adjacent soft tissues. Medartis is represented worldwide through its subsidiaries and a broad distributor network.

Our motto is «Precision in fixation». We place the highest priority on maintaining stringent quality standards, continuous further development and innovation as well as comprehensive service provision for surgeons, OR staff and patients. This enhances long-term customer relations based on partnerships and has formed the foundation for sustainable success since the company's founding in 1997. The goal of Medartis is to continually improve early functional rehabilitation through its high-quality products and exclusively developed technologies.

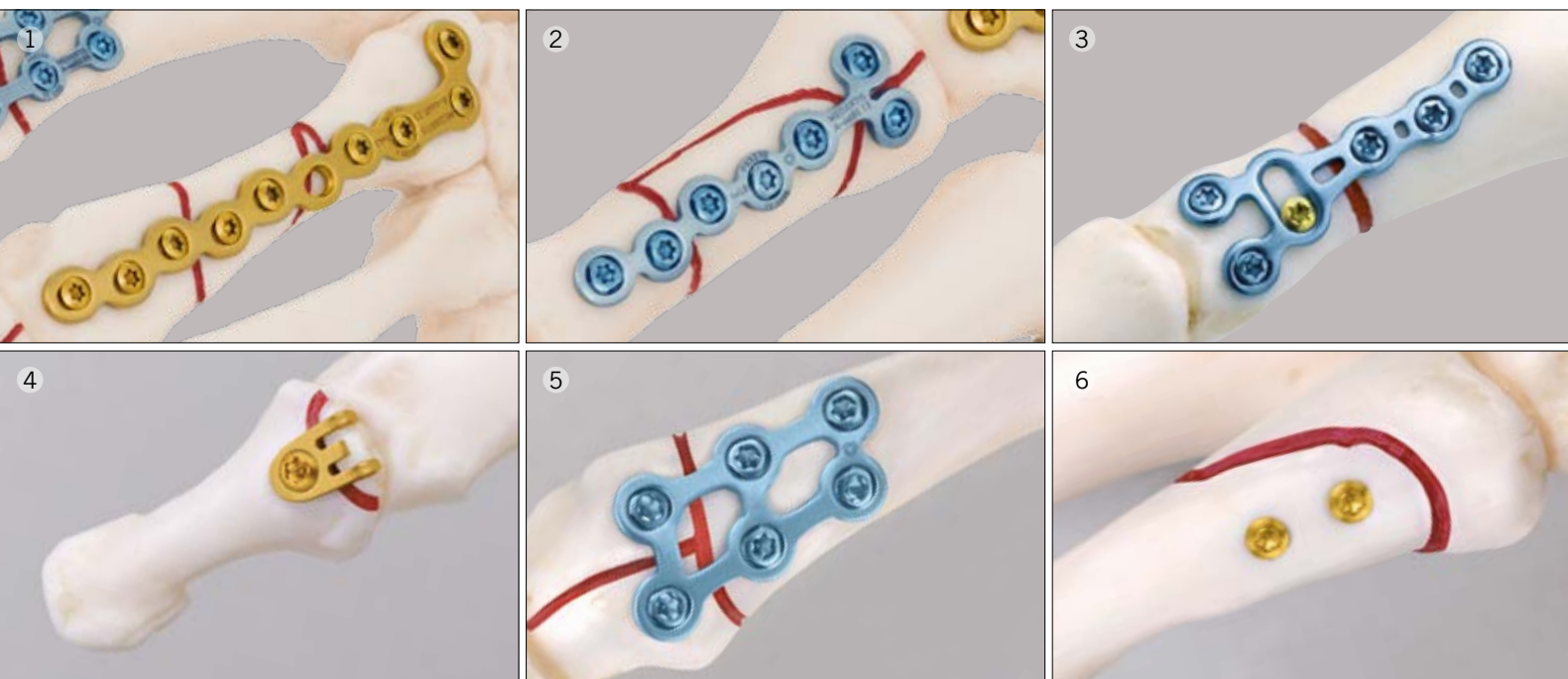
In order to fulfill the growing requirements of medical devices, our development teams engage in intensive knowledge exchange with our customers, partners and leading scientific institutes globally. Medartis' international locations allow us to determine the needs of surgeons and patients directly on site and to incorporate these needs into product development. This is the only way we can efficiently resolve current clinical problems and offer market-oriented products for use in the OR.

Service quality is considerably shaped by our international presence as well as local cooperation. Product quality is maintained by the fact that the entire process chain – from development to aftercare – is in the hands of our internal departments. Medartis can thus exclusively apply the newest technologies during product development for special areas such as small-bone surgery. At the same time, we have the greatest possible control over process quality and flexibility.

27 Bones – a Multitude of Options

APTUS Hand

- Fractures of the distal, middle and proximal phalanges as well as of the metacarpals
- All transverse fractures, spiral fractures, fractures near joints with or without joint involvement, shaft fractures, comminuted fractures, dislocated fractures and ligament/bone avulsions
- DIP, PIP and carpal arthrodesis



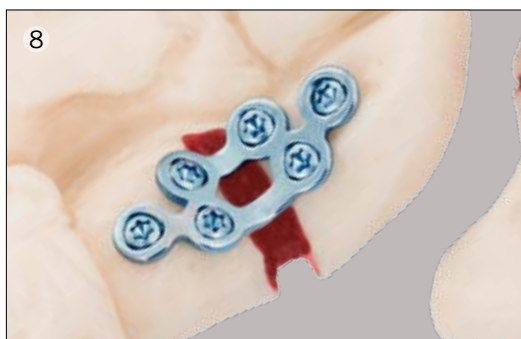
APTUS Hand

Trauma

Every fracture is different and must be treated accordingly. The primary objective is functional and pain free restoration of the anatomy and movement functionality of the hand. Medartis offers a large selection of plates and screws to find the best solution for all fracture types. Plate fixation and angular stable treatment solutions, according to the principle of internal fixation, permit early mobilization^{11, 13, 15} and considerably reduce the regeneration time after a surgical intervention.

Arthrodesis

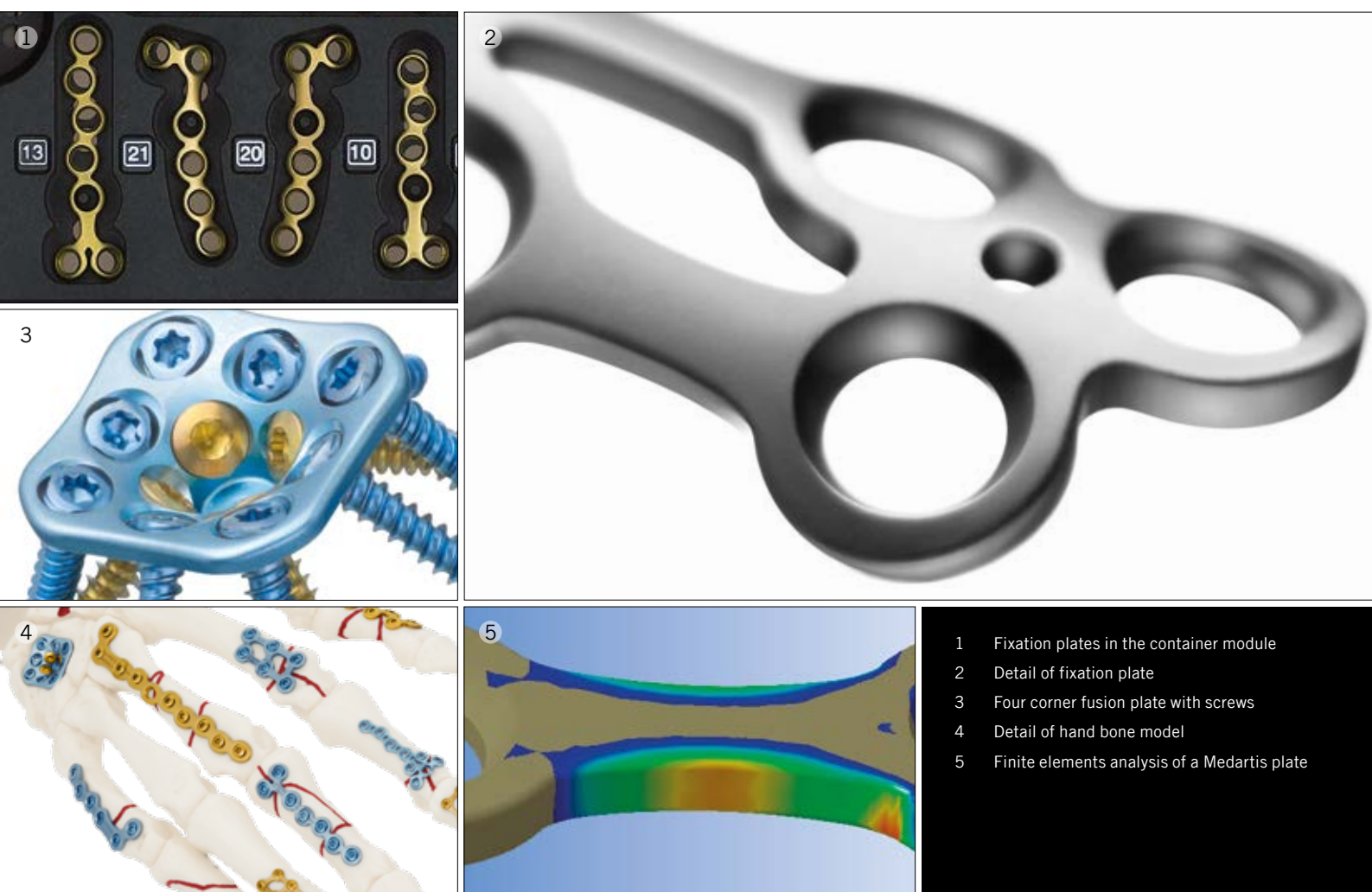
Arthrosis of the finger joints represent a frequent problem in medical practice. Pain free mobility of the finger joints is prerequisite for the functionality of the hand. If this can no longer be assured, arthrodesis is a potential method for treating painful finger joints.



- 1 Metacarpal oblique and transverse fracture
- 2 Joint and shaft fracture of proximal phalanx
- 3 Rotation correction
- 4 Ligament/bone avulsion
- 5 Intra-articular fracture of metacarpal
- 6 Oblique fracture
- 7 Intra-articular fracture of phalanx
- 8 Scaphoid fracture
- 9 PIP arthrodesis
- 10 Four corner arthrodesis

Anatomical Plate Design

APTUS Hand



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

- The complete system for hand fracture management
- Multidirectional ($\pm 15^\circ$) and angular stable fixation
- Fracture specific treatment and arthrodesis

Plate Range

The plate range includes a broad portfolio of various plates for the following indications:

- Fractures of the distal, middle and proximal phalanges as well as of the metacarpals
- Transverse fractures, spiral fractures, fractures near joints with or without joint involvement, shaft fractures, comminuted fractures, dislocated fractures and ligament/ bone avulsions
- DIP, PIP and carpal arthrodesis

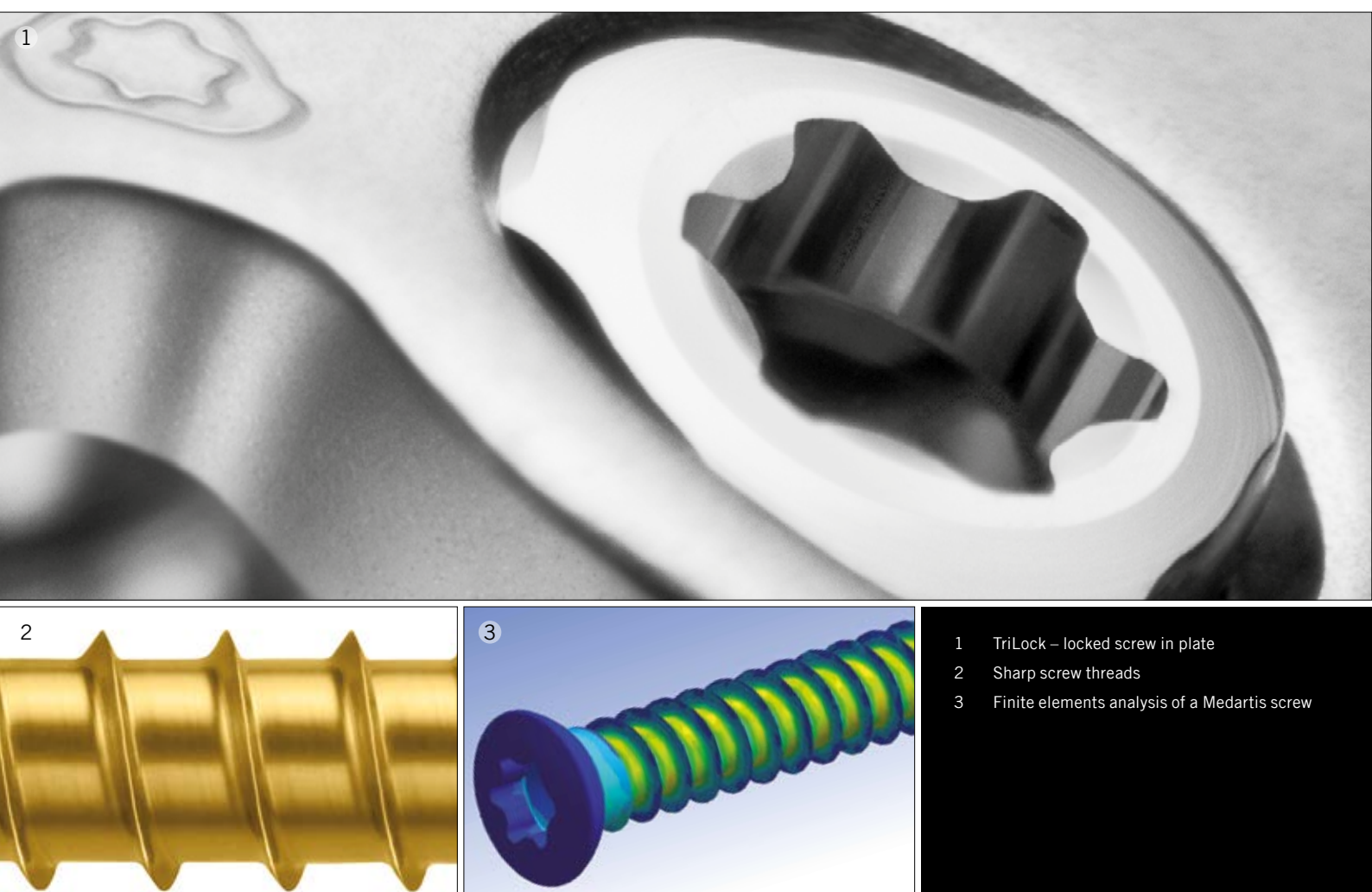
Plate Features

- Anatomically pre-contoured plate geometries
- Rounded edges and a smooth surface offer protection of the soft tissues
- Color-coded implants for easy identification in the OR:
 - Gold = Fixation/compression plates and cortical screws (fixation)
 - Blue = TriLock plates and TriLock screws (locking)
- Offset screw holes in numerous plates avoid collisions between screws and prevent bone splitting during drilling and screw insertion¹
- 2 screw sizes can be used for each plate thickness:
 - 1.2/1.5 screws for 1.2/1.5 plates with a plate thickness of 0.6 or 0.8 mm
 - 2.0/2.3 screws for 2.0/2.3 plates with a plate thickness of 1.0 or 1.3 mm



Superior Screw Technology

APTUS Hand



For further information on the screw range, see the APTUS Ordering Catalog at www.medartis.com/meta/downloads/product-brochures

- HexaDrive interface with patented self-holding properties
- Effective thread characteristics
- Increased torsional, bending and shear stability

Screw Options

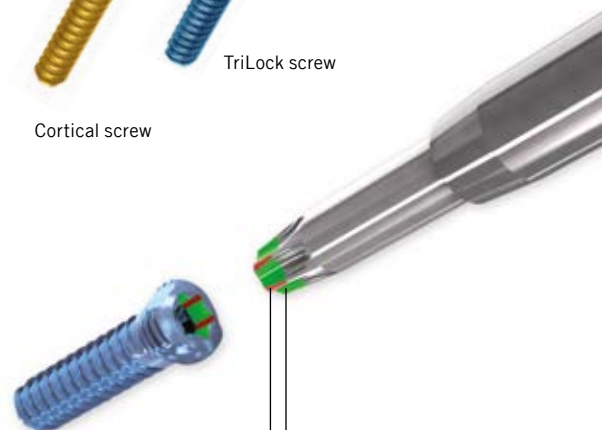
- 1.5/2.0 TriLock screws (locking)
- 1.2/1.5/2.0/2.3 cortical screws (fixation)

Screw Features

- Patented HexaDrive screw head design
 - Secure connection 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
- Adapted pitches of the screw thread in cortical screws depending on screw length
- Double threaded TriLock screws reduce screw insertion time

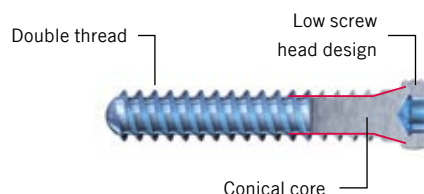


Cortical screw



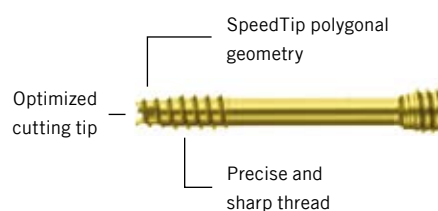
Contact surface for screw retention (red)

Contact surface for torque transmission (green)



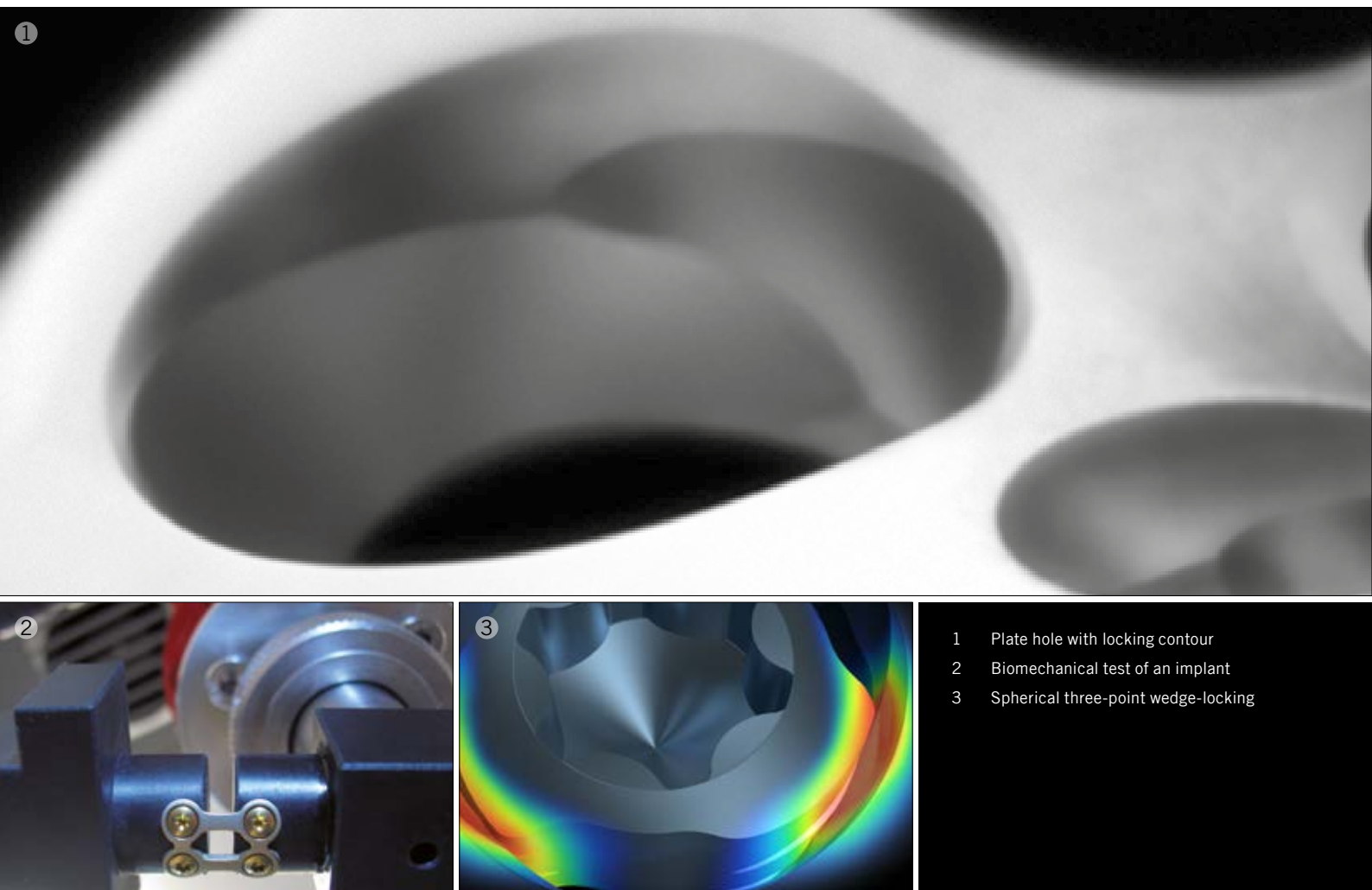
SpeedTip CCS Cannulated Compression Screw

- Screws can be inserted directly without pre-drilling
- Reduced risk of bone fragment displacement thanks to excellent cutting behavior
- Effortless insertion – the polygonal tip pushes bone debris aside



Technology, Biomechanics and Material

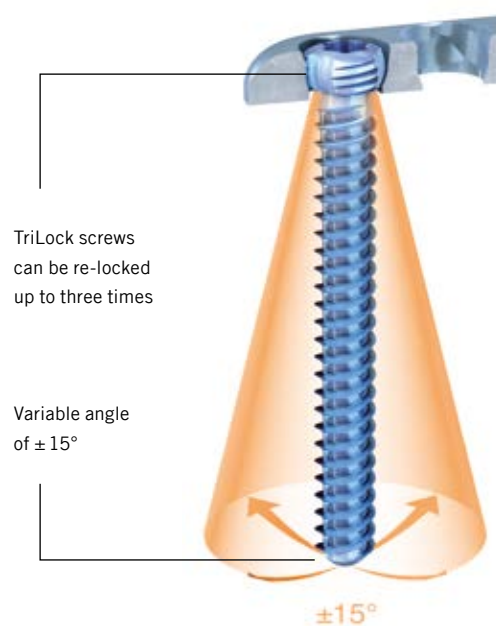
APTUS Hand



- Patented TriLock locking technology
- High-grade materials
- High quality standard

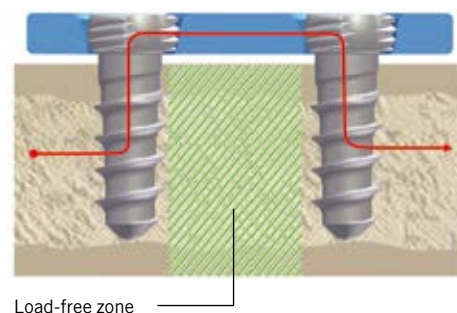
Technology

- 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 re-locked 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



Biomechanics

- Internal fixator principle
 - Stable plate – screw construct allows the bridging of unstable zones
 - Improved vascularization of the periosteum due to low contact of the plate



Material

All APTUS implants are made of pure titanium (ASTM F67, ISO 5832-2) or titanium alloy (ASTM F136, ISO 5832-3).

All of the titanium materials used are biocompatible, corrosion-resistant and non-toxic in a biological environment. K-wires are made of stainless steel (ASTM F 138); instruments are made of stainless steel, PEEK, aluminum or titanium.

Instruments

APTUS Hand



- 1 Plate bending pliers in use
- 2 Plate cutting pliers
- 3 Self-holding mechanism screw/screwdriver
- 4 Color-coded instruments in the instrument tray
- 5 Measuring unit of the depth gauge

- Reduced instrument kit
- Intuitive application due to clear color coding
- Easy to use

Simple Instrument Kit

The Medartis instruments are compact, ergonomically designed and easy to use.

- Depth gauge for single-handed use
- One screwdriver and one plate holding and positioning instrument each for the systems 1.2/1.5 and 2.0/2.3
- One drill guide each for the systems 1.2/1.5 and 2.0/2.3
- One plate bending pliers for all plate sizes
- One plate cutting pliers for all plate sizes



Clear Color Coding Concept

Twist drills and instruments have a consistent and clear color code which allows for intuitive use within the different system sizes.

APTUS 1.2 = red

APTUS 1.5 = green

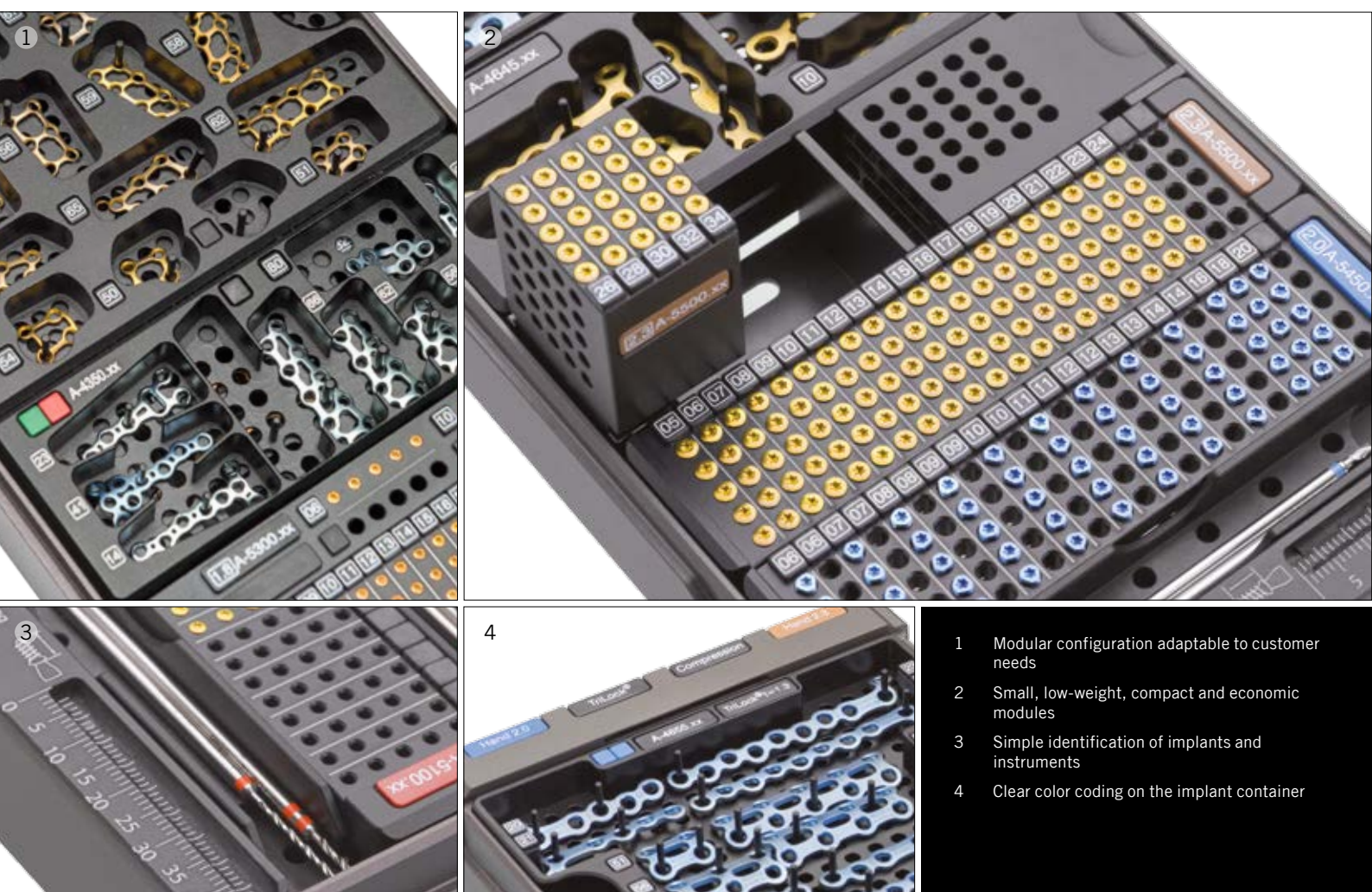
APTUS 2.0 = blue

APTUS 2.3 = brown



Storage

APTUS Hand



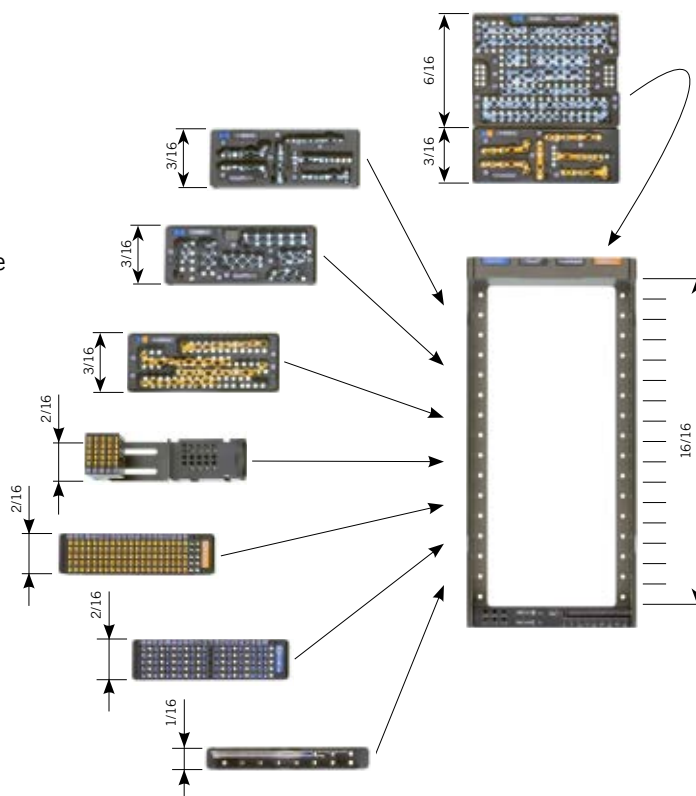
- 1 Modular configuration adaptable to customer needs
- 2 Small, low-weight, compact and economic modules
- 3 Simple identification of implants and instruments
- 4 Clear color coding on the implant container

- Modular, economic, compact
- 16/16 – can be configured to suit the customer's need
- Clear and consistent color coding

Modular Container Concept

The base frame in the 16/16 grid can be freely combined with screw and plate modules of different sizes, allowing the customer to configure an individual APTUS Hand system.

- 16/16 Base frame
- 1/16 Twist drill module
- 1/16+2/16 Screw modules
- 3/16–6/16 Plate modules



Individual Configuration

Plates and screws may be combined freely in the implant containers. From a small basic set up to the complete product range, everything can be adapted to the needs of the individual user.



Flexible Color Coding and Labeling Concept

The use of colored stickers in the implant container permits consistent and clear color coding of the individual implants and system sizes, ensuring clear identification of the plates and screws.



Clinical Examples

APTUS Hand

Case 1 – Osseous extensor tendon avulsion of the distal phalanx



Preoperative lateral X-ray



Intraoperative view of the avulsed fragment



Postoperative lateral X-ray
Fixation with hook plate

Case 2 – Fracture of the Proximal Phalanges III and IV



Preoperative X-rays
72 year old woman, 4 weeks after fall from a ladder with temporary K-wire fixation



Osteosynthesis with two grid plates

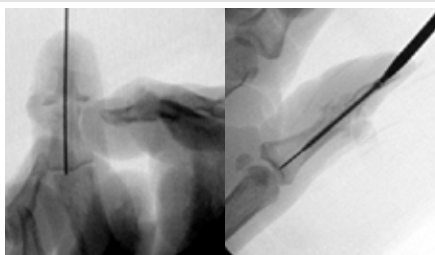


Postoperative X-rays

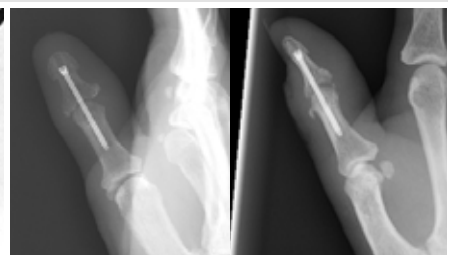
Case 3 – DIP Arthrodesis Thumb



Preoperative X-ray
Patient: male, 68 years old
Several year history of IP joint thumb pain, unresponsive to NSAIDs and splinting



Intraoperative X-rays
Left: Insertion of the K-wire
Right: Placement of a 2.2 CCS



Postoperative X-rays

Clinical cases published with the kind permission of:

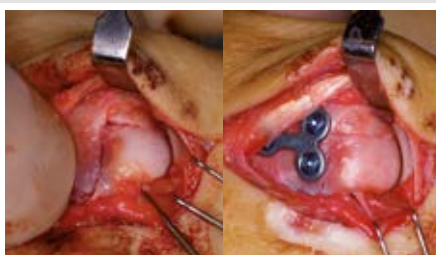
M. Aerni, Switzerland (1) | D. Schäfer, Switzerland (2) | W. Geissler, USA (3) | Chr. Ranft, Germany (4)

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

Case 4 – Metacarpals II/III – head fractures



Preoperative X-ray



Manual repositioning and stabilization with 2.0 angular stable plates.



Postoperative oblique X-ray

Case 5 – Metacarpal shaft fracture



Preoperative X-rays



Plate fixation with 2.0 / 2.3 compression plates

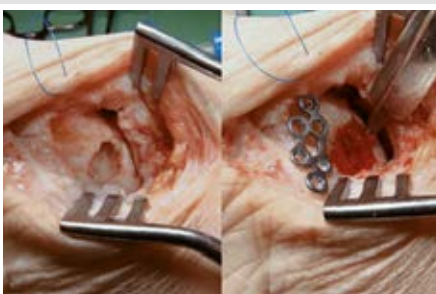


Postoperative X-rays

Case 6 – Scaphoid Nonunion



Preoperative CT and X-ray
Patient: male, 38 years old
Nonunion of the scaphoid



Intraoperative image, volar
Left: Resection of the pseudarthrosis tissue
Right: Pre-fixation of the scaphoid plate with a suture



X-rays, 10 weeks postoperatively
The union of the pseudarthrosis is well visible

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