Surgical Technique

3.5mm
Clavicle-Hook-Plate

SYNMEDICS™

This surgical technique alone does not provide sufficient background for immediate use of the described system. An instruction by a qualified surgeon who is experienced in handling the system is therefore strongly recommended.

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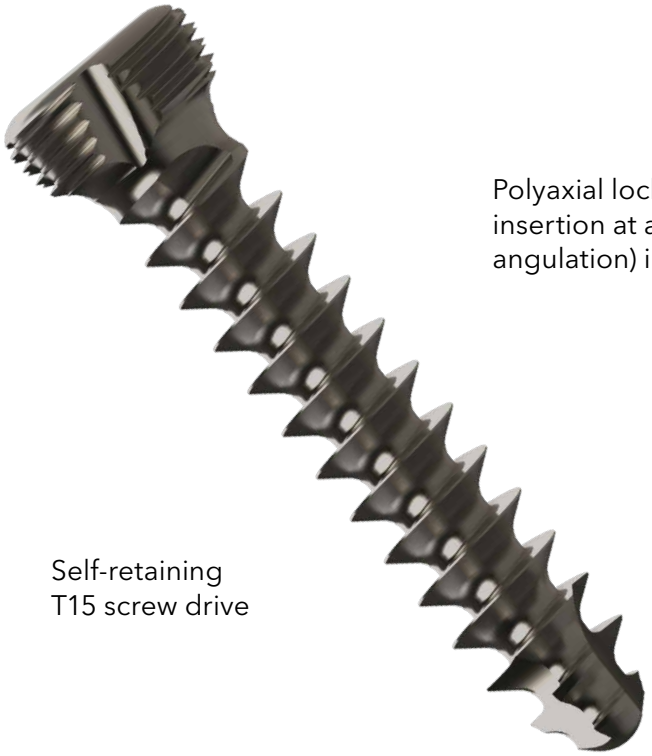


Polyaxial locking screws for multidirectional insertion at an angle up to 15° (off-axis screw angulation) in all directions

Self-retaining
T15 screw drive

Anatomical plate design

Rounded, tapered hook design and optimized hook angle for a biomechanically favourable position of the hook with an optimal grip under the acromion

2 hook depths: 12mm and 15mm

Rounded edges, the slim plate profile, the smooth coated surface as well as screws that sit flush on the plate reduce the risk of irritation of the surrounding soft tissue

Suture holes at the lateral ends of the plate head for additional fixation of the acromioclavicular ligament with sutures

Dedicated Kirschner wire holes at the proximal end of the plate for temporary fixation

Undercuts in the shaft

Type II anodization for a simplified implant removal after fracture healing

Features & Benefits

The anatomical plate design facilitates an optimal placement of the plate at the clavicle and the acromioclavicular joint.

Rounded edges, the slim plate profile, the smooth coated surface as well as screws that sit flush on the plate reduce the risk of irritation of the surrounding soft tissue.

The rounded, tapered hook design and the hook angle facilitate a biomechanically favourable position of the hook with an optimal grip under the acromion.

Undercuts in the shaft prevent a reduced periosteal blood supply.

The polyaxial locking screws enable multidirectional insertion at an angle up to 15° (off-axis screw angulation) in all directions and therefore provide the necessary intraoperative flexibility to individually consider particular fracture patterns.

The T15 screw drive ensures optimal force transmission, reduces the risk of deformation of the screw drive and allows for self-retention of the screw on the screwdriver.

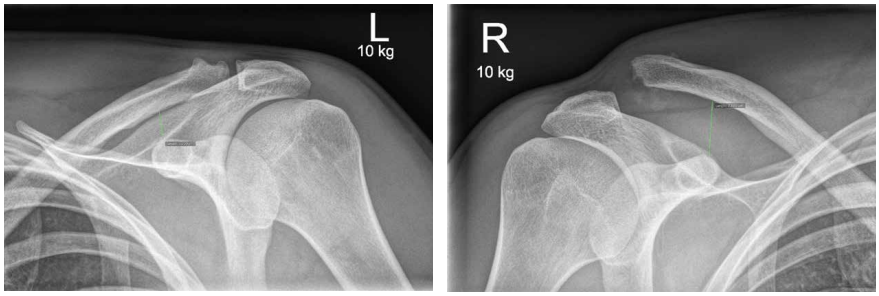
The special surface coating of the plates and screws (Type II anodization) favours a simplified removal of the implants after fracture healing.

Dedicated Kirschner wire holes in the plate allow for temporary Kirschner wire fixation to facilitate the positioning of the plate on the bone.

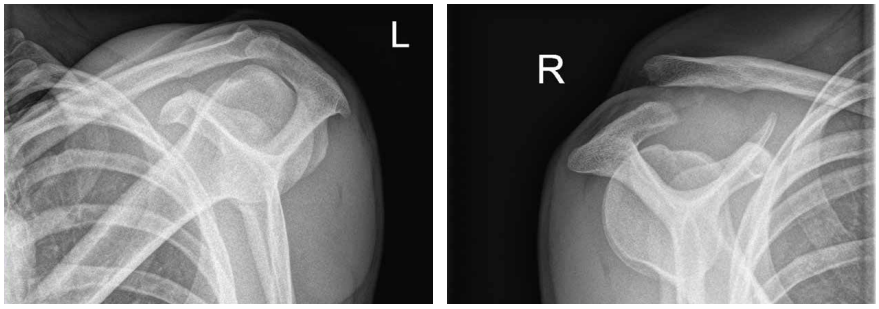
Suture holes at the lateral ends of the plate head allow additional fixation of the acromioclavicular ligament with sutures. Suture feeding is enabled through the undercuts with the plate in situ.

Clinical Case

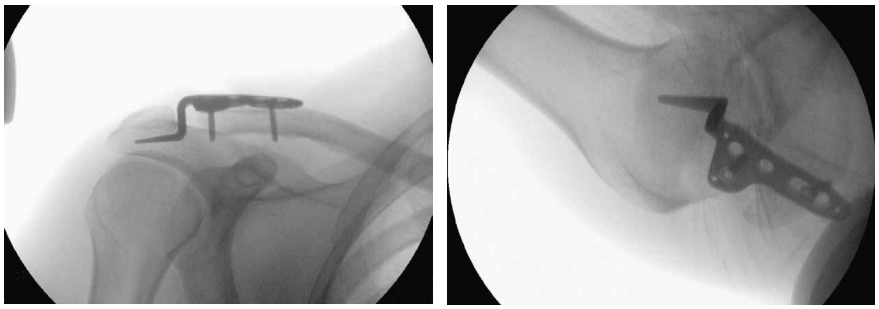
(PROVIDED BY THE DEPARTMENT OF ORTHOPEDICS AND TRAUMA SURGERY, UNIVERSITY OF FREIBURG MEDICAL CENTER)



1. PREOPERATIVE STRESS X-RAYS (10KG)

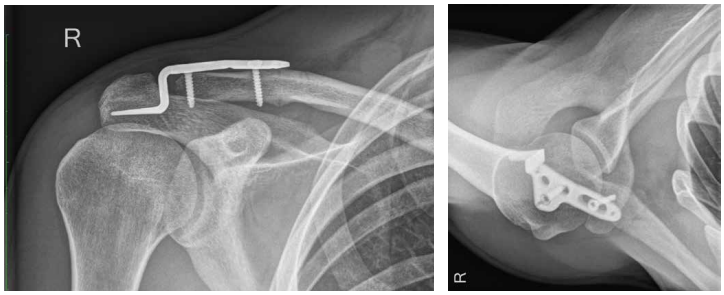


2. PREOPERATIVE X-RAYS (ALEXANDER VIEW)



3. INTRAOPERATIVE X-RAYS

27-year-old male patient
AC joint separation while playing football



4. POSTOPERATIVE X-RAYS

5. POSTOPERATIVE STRESS X-RAYS (10KG) DOCUMENTATION OF COMPLETE LIGAMENT HEALING

Indications

The 3.5mm Clavicle-Hook-Plate is indicated for the following:

- Lateral fractures of the clavicle (Jaeger and Breitner)
- Dislocations of the acromioclavicular joint (Rockwood)
- To secure a ligament reconstruction with an autograft in symptomatic chronic AC joint instabilities

Surgical Technique

1. Preparation

Make a sabre-cut incision in the cleavage lines of the skin over the acromioclavicular joint and perform an epifascial preparation laterally and medially. Perform a longitudinal incision of the fascia from the lateral end of the clavicle to the acromioclavicular joint; the lateral end of the clavicle is usually deperiosted in the Rockwood V injury.

Reduce the clavicle and temporarily transfixate it from the lateral acromion with a Kirschner wire.

2. Selection of the plate

Determine the required hook depth with the aid of the trial implants. Prior to insertion, check the markings on the trial implant to ensure the correct hook depth and the desired side ("R" for right or "L" for left) has been selected.

Position the hook under the acromion and place the shaft of the trial implant from superior on the clavicle. If necessary, temporarily fix with a Kirschner wire through the dedicated hole at proximal end of the shaft.

Ensure that the hook makes contacts with the acromion when positioning the shaft on the clavicle. The biomechanically optimal position of the hook is perpendicular to the acromion.

Use the image intensifier to ensure that the AC joint is correctly reduced and full shoulder mobility is achieved.

Remove trial implant.

3. Positioning of the plate

After determining the hook depth, select the required plate and position it as described above.

Confirm the correct positioning of the plate with the image intensifier.

Once the plate is positioned correctly, it can be temporarily fixated with a Kirschner wire through the dedicated hole at proximal end of the shaft.

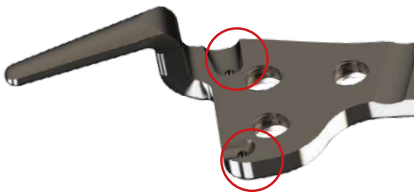
4. Insertion of the screws

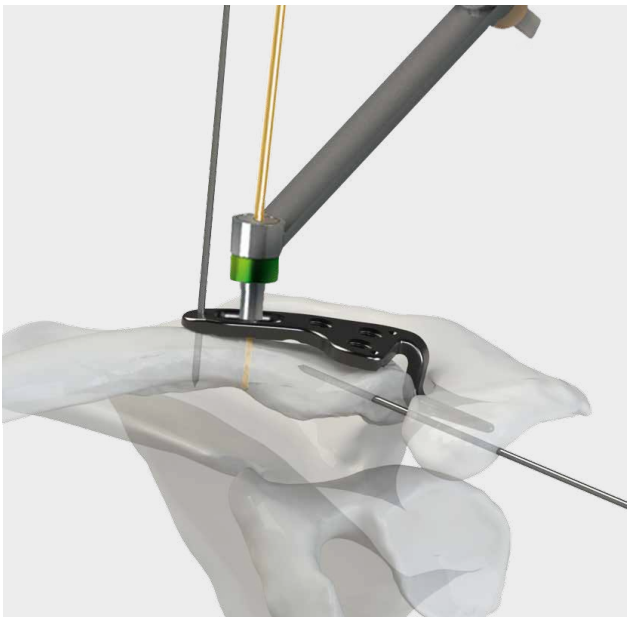
Use the double drill sleeve and the drill Ø2.5mm to prepare a screw hole through the long hole in the plate shaft. Determine the required length of the screw with the depth gauge for 3.5mm screws, insert the corresponding 3.5mm cortex screw and tighten it with the hexagon screwdriver.

If necessary, adjust the position of the plate before final tightening.

Before continuing the fixation with a second screw, the width of the AC joint should be checked with the image intensifier. If necessary, perform a reduction by applying manual pressure on the shoulder and temporarily fixating the joint with a Kirschner wire that is percutaneously introduced from the acromion.

Important: If a reduction has been performed during this step, the acromioclavicular ligaments should be secured with a suture cerclage using the suture holes on the distal plate head.



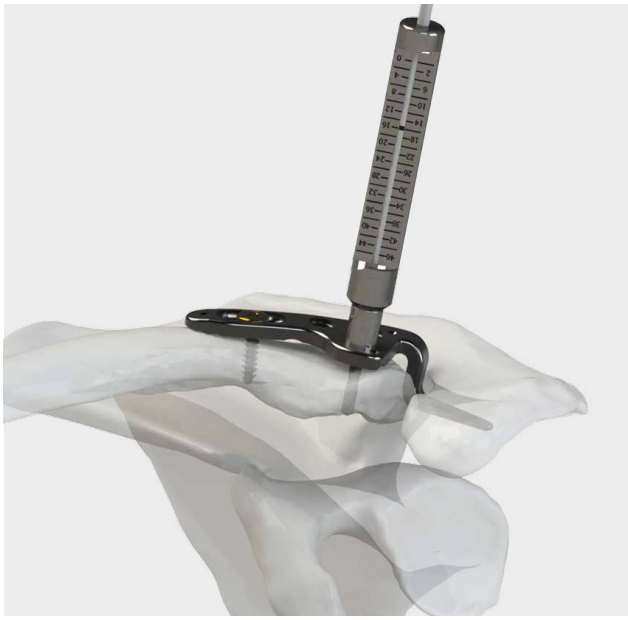


Prepare additional screw holes for 3.5mm polyaxial locking screws using the drill Ø2.7mm.

The drill Ø2.7mm must always be used in conjunction with a drill guide to prevent direct contact with the surrounding tissue, to prevent damage to the plate and to ensure proper alignment of the screw hole. To do so, the methods described under points a and b can be applied.

a. Polyaxial drill guide
Except for the long hole, all plate holes can be used with polyaxial locking screws. To drill a screw hole in a variable angle (up to 15° in all directions), insert the polyaxial drill guide in the respective plate hole and use the drill Ø2.7mm to drill a screw hole in the desired angle.

b. Monoaxial drill guide
Screw holes are prepared at a predefined angle using the drill sleeve with scale and the drill Ø2.7mm. Insert the drill sleeve with scale into the desired plate hole and use the drill Ø2.7mm to prepare a screw hole with the predefined angle. The required screw length can be read at the laser marking on the drill Ø2.7mm and the scale on the drill guide.



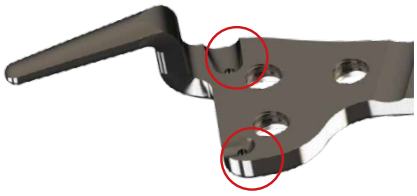
After the screw hole preparation, remove the drill guide and determine the screw length using the depth gauge for 3.5mm screws.

Important: To prevent neurovascular injury, the screw length should be carefully determined.

Insert the appropriate 3.5mm polyaxial locking screw and tighten it with the T15 screwdriver.

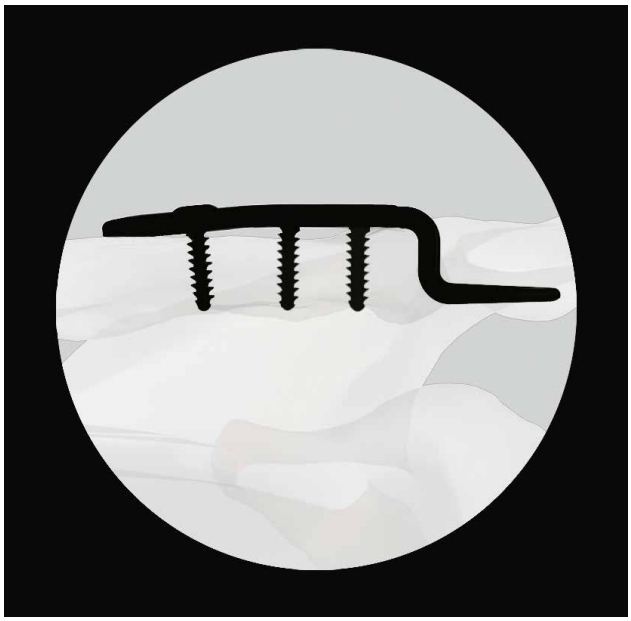
Repeat the steps described above until a stable fixation is achieved and finally check that all screws are tightened.

If necessary, perform an additive stabilization of the acromioclavicular ligament with sutures through the suture holes on the distal plate head.



5. Control of the fracture treatment

Use the image intensifier to check the correct anatomical reduction of the fracture, the correct plate position and the correct lengths and angulations of the inserted screws.



Implants

PLATES*

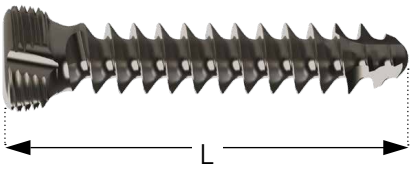
Article No.	Plate Holes	Hook Depth (mm)	Left / Right
150-6435-501	4	12	L
150-6435-502	4	12	R
150-6435-503	4	15	L
150-6435-504	4	15	R
150-6435-505	6	12	L
150-6435-506	6	12	R
150-6435-507	6	15	L
150-6435-508	6	15	R

* Titanium – 6% Aluminium – 4% Vanadium Alloy (Ti6Al4V); anodized according to VH-TYPE II
All plates are also available sterile packed. The article number is extended by an "-S".

SCREWS

Polyaxial Locking Screws Ø3.5mm*

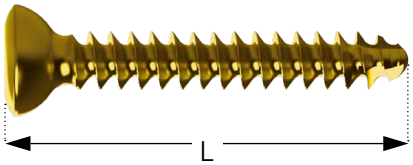
150-6135-010PTXL-
150-6135-026PTXL



T15

Cortex Screws, self-tapping Ø3.5mm**

001-0004-010ST-
001-0004-026ST



2,5mm
hex

The screw length is measured inclusive screw head.

* Titanium – 6% Aluminium – 4% Vanadium Alloy (Ti6Al4V); anodized according to VH-TYPE II

** Titanium – 6% Aluminium – 4% Vanadium Alloy (Ti6Al4V)
All screws are also available sterile packed. The article number is extended by an "-S".

Instruments

Kirschner wire w. trocar point
004-0310-016

Screwdriver shaft T15, w.AO-conn.
150-7100-024

Screwdriver shaft 2.5mm w. AO-coupling
005-0214-003

Holding sleeve 2.7/3.5/4.0mm screws
009-0390-052

Screwdriver handle w. AO-coupling
013-0011-050

Drill Ø2.7mm, w. AO-conn.
150-7100-032

Drill Ø2.5mm, w. AO-conn.
005-0210-022TIN

Drill guide f. drill Ø2.7mm, polyaxial
150-7100-026

Drill guide f. drill Ø2.7mm, w. scale
150-7100-025

Double drill sleeve 3.5 / 2.5mm
005-0222-032

Depth gauge f. 3.5mm screws
150-7100-029

Trial implants f. clavicle hook plate
150-7100-501-504

Dismantling

Steps for reprocessing:

1) Disassembling
2) Manual cleaning*
3) Automated cleaning with manual pre-cleaning and ultrasonic cleaning
4) Visual inspection and function control check
5) Assembling
6) Steam sterilization

* For detailed instructions on manual cleaning, automatic cleaning and steam sterilization, please refer to mahe medical document "Instructions for Use – Surgical Instruments".

Depth gauge f. 3.5mm screws (150-7100-029)

1)

2)

Double drill sleeve 3.5/ 2.5mm (005-0222-032)

1)

2)

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