

LOCTEC®

## Proximal Lateral Tibia Plate 4.5 Surgical Technique



## **Disclaimer**

This surgical technique is exclusively intended for medical professionals, especially physicians, and therefore may not be regarded as a source of information for non-medical persons. The description of this surgical technique does not constitute medical advice or medical recommendations nor does it convey any diagnostic or therapeutic information on individual cases. Therefore, the attending physician is fully responsible for providing medical advice to the patient and obtaining the informed consent of the patient which this surgical technique does not supersede.

The description of this surgical technique has been compiled by medical experts and trained staff of aap Implantate AG with utmost diligence and to the best of their knowledge. However, aap Implantate AG excludes any liability for the completeness, accuracy, currentness, and quality of the information as well as for material or immaterial damages arising from the use of this information.

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The system LOQTEQ® Proximal Tibia Plates 4.5 comprises bone plates and screws for application at the proximal tibia as well as the necessary accessories for insertion. The flexibility of the system allows for safe reduction and stable fixation of various fracture patterns with respect to the indications mentioned in this technical guide. The design features of the implants in combination with standard surgical techniques and proven stability result in reliable constructs to support the bone during the healing process and allow for early mobilization of the patient.

## Material

The LOQTEQ® implants and instruments are manufactured using high-quality materials, which have been proven to be successful in medical technology for decades. The anatomical plates and bone screws are made of titanium alloy. All materials employed comply with national and international standards. They are characterized by good biocompatibility, good mechanical properties and insensitivity against allergic reactions. LOQTEQ® implants show a highly polished surface.

## Indications/Contraindications

### Indications

The **aap LOQTEQ® Proximal Lateral Tibia Plate 4.5 System** is intended for:

- treatment of nonunions, malunions, and
- fractures of the proximal tibia, including simple, comminuted, lateral wedge, depression, medial wedge, bicondylar combination of lateral wedge and depression, and fractures with associated shaft fractures.

### Contraindications

- Infection or inflammation (localized or systemic)
- Allergies against the implant material
- High risk patients for anesthesia
- Severe soft tissue swelling impacting normal wound healing
- Insufficient soft tissue coverage
- Fractures in children and adolescents with epiphyseal plates not yet ossified

### ◆ Caution:

**aap bone screws are neither designed nor approved for bolting or fixation of any elements (pediculi) of the cervical, thoracic or lumbar spine.**

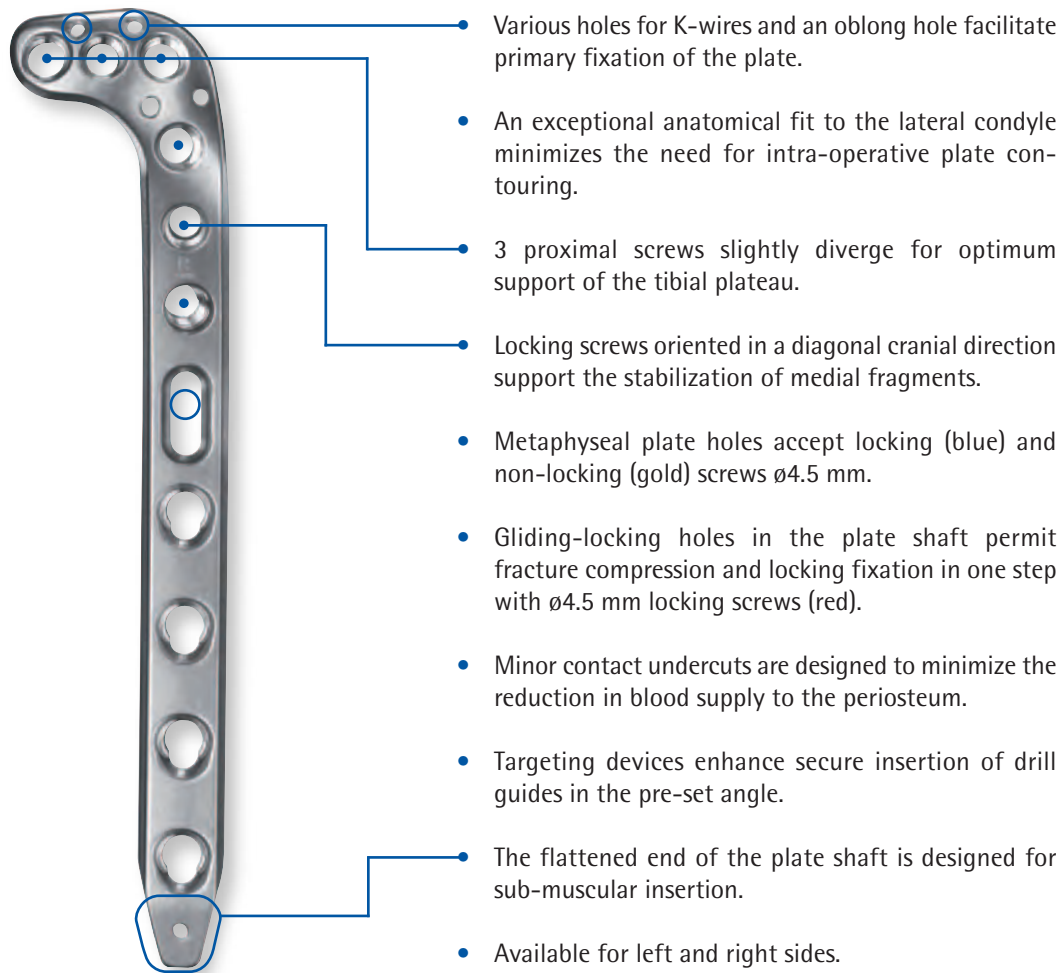
Detailed information on indications, contraindications and a complete list of adverse effects is included in the instructions for use.

## Processing (Sterilization & Cleaning)

**aap** markets unsterilized products which are appropriately labeled and must be appropriately processed before use (see Instructions for Use, chapter "Processing of Medical Devices").

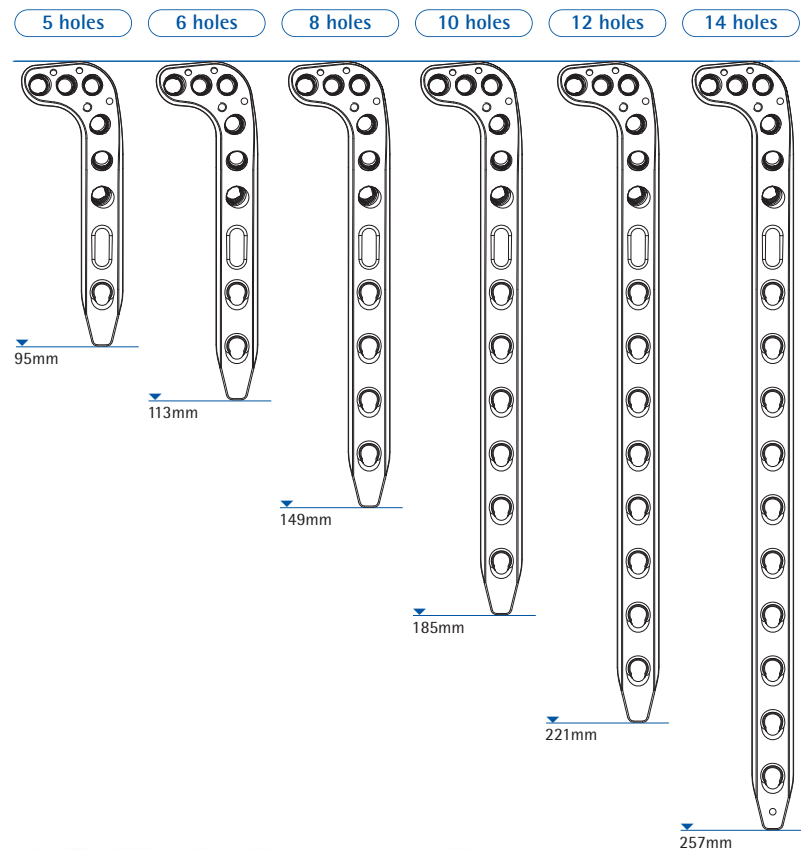
Never use damaged implants or implants from damaged packaging.

## Features & Benefits



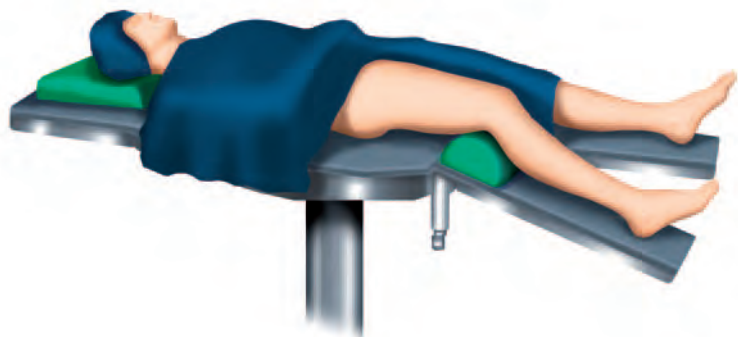
## Preoperative planning

- Evaluate the fracture situation and select the appropriate plate size and position with an X-ray. Consider the use of independent lag screws, if necessary.
- Preoperatively assess the fracture situation using CT imaging where necessary.



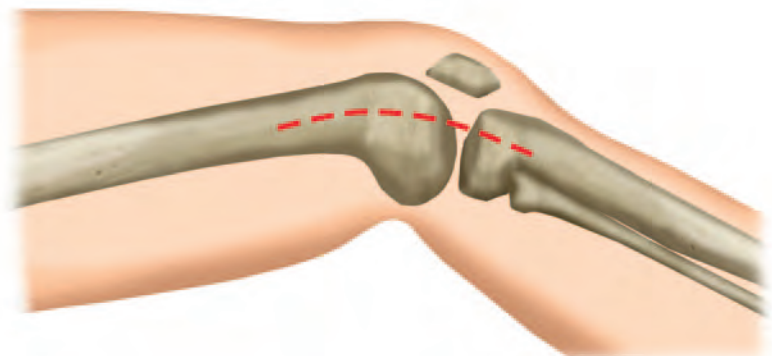
## Patient positioning

- Place the patient in the supine position on a radiolucent operating table. Visualization of the proximal tibia under fluoroscopy in both AP and lateral views is necessary.



## Approach

- Lateral, according to the fracture situation.



## Preparing the plate



### INSTRUMENTS

Aiming device LOQTEQ® PLT Plate 4.5, R  
Aiming device LOQTEQ® PLT Plate 4.5, L  
Fixing screw aiming device LOQTEQ® LFI, T25  
Screwdriver Duo, T25, quick coupling  
Large handle, cannulated, quick coupling

### ART.-NO.

IU 8173-01  
IU 8173-02  
IU 8176-04  
IU 7835-56  
IU 7706-00

- Select the plate that fits the fracture pattern and patient's anatomy.
- Position the aiming device on the plate and secure it with the fixing screw to facilitate correct alignment of the drill guides.

#### ◆ NOTE:

The fixing screw is connected to the aiming device in such a way that it is self-retaining. It can be removed for cleaning by applying gentle pressure to the tip of the screw from below.

#### ◆ NOTE:

Anatomically pre-contoured plates minimize the need for intra-operative bending. If necessary, the plates may be contoured.

#### ◆ CAUTION:

Contouring the metaphyseal part of a plate is not permitted when using a targeting device.

#### ◆ CAUTION:

Anatomically preformed plates should not be bent where possible. If plates are adapted to anatomical bone structures, the implants should not be bent back and forth repeatedly and excessively as this may result in implant failure. Damage caused by sharp edges should be avoided when bending. Locking plates should in principle be bent in the area between the holes only. Bending plates along locking holes may impair or even abolish their function completely. If angular stability is compromised by bending, a non-locking screw should be used.

## Reduction and primary fixation



### INSTRUMENTS

K-wire with trocar point, ø2.0, L 250

### ART.-NO.

NK 0020-25

- Reduce and temporarily secure fracture fragments and the articular surface. Care must be taken when positioning K-wires or independent lag screws, that they do not interfere with the later plate position.
- External fixation may help with axial, angular and rotational control intraoperatively.
- Confirm anatomic reduction using fluoroscopy.
- Insert the plate from proximal to distal until the head portion is properly aligned under the tibial plateau. The plate is fixed to the bone with K-wires. Using a cortical screw in the oblong hole for primary fixation allows for corrections in plate positioning.
- Confirm plate position using fluoroscopy.

## Insertion of cortical screws (gold)



### INSTRUMENTS

Double drill guide  $\varnothing 3.2/4.5$ , with spring aided centering  
 Twist drill  $\varnothing 3.2$ , L 195, coil 50, quick coupling, single use  
 Twist drill  $\varnothing 4.5$ , L 145, coil 50, quick coupling, single use  
 Depth gauge for screws  $\varnothing 4.5$ -6.5, up to L 100mm  
 Screwdriver, quick coupling  
 Handle for quick coupling, large, cannulated

### ART.-NO.

IU 8117-50  
 IU 7432-30-1U  
 IU 7445-00-1U  
 IS 7905-20  
 IU 7835-56  
 IU 7706-00



### ◆ NOTE:

If a combination of locking and non-locking screws is used, non-locking screws must be inserted first.

- To insert a cortical screw  $\varnothing 4.5$  mm (gold) in the oblong hole, place the double drill guide in the center of the oblong hole and press it down. Drill to the desired depth with an appropriate drill. Determine the length of the screw using the depth gauge and insert a screw of appropriate length using the screwdriver.

### ◆ NOTE:

Ensure proper alignment of the screwdriver and that the screwdriver tip is fully seated in the screw head.

- This screw can push the plate to the bone, if necessary.
- Check the plate position using fluoroscopy and adjust if required.
- Use this technique for inserting non-locking screws without compression into any other plate hole.
- When using a cortical screw as a lag screw, start with the drill for the gliding hole and the appropriate side of the double drill guide. Drill through the near cortex or perforating the fracture line, center the other side of the drill guide in the gliding hole and drill the core hole with an appropriate diameter drill through the far cortex. Determine the screw length using the depth gauge and insert a non-locking cortical screw of the appropriate length.





## Insertion of locking screws (blue)

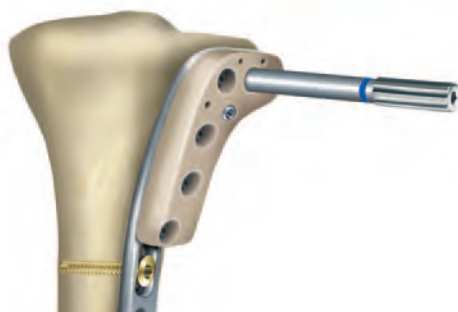


### INSTRUMENTS

Drill guide for round hole LOQTEQ® 4.5, L-ø3.9, blue  
Reduction sleeve for K-wire ø2.0  
K-wire with trocar point, ø2.0, L 250  
Twist drill ø3.8, L 180, coil 50, quick coupling, single use  
Twist drill ø3.8, L 250, coil 50, quick coupling, single use  
Stop ring for depth measurement, LF  
Depth gauge for screws ø4.5-6.5, up to L 100

### ART.-NO.

IU 8167-20  
IU 8167-15  
NK 0020-25  
IU 7438-18-1U  
IU 7438-25-1U  
IU 8184-03  
IS 7905-20



### ◆ NOTE:

If a combination of non-locking and locking screws is used, non-locking screws must be inserted first.

- Close to a joint, it is recommended to check the position of the later inserted screws with a K-wire. Insert a drill guide (blue) with reduction sleeve into a proximal plate hole for insertion of a K-wire ø2.0 mm and confirm later screw alignment using fluoroscopy. Adjust plate position if required. Remove K-wire and reduction sleeve for drilling.
- Drill to the desired depth using a drill ø3.8 mm (blue/red).

### ◆ CAUTION:

The screwdriver duo is not intended for screwing the drill guide into the plate.

- The screw length can be read off the calibration of the drill or determined using the depth gauge, after the drill guide has been removed. The stop ring facilitates reading off the calibration when attached to the drill. Push it down to the drill guide and remove the drill for reading the drilling depth in the gap of the ring.

### ◆ NOTE:

The screwdriver duo facilitates manual removal of the drill guide.



**INSTRUMENTS**

Screwdriver Duo, T25, quick coupling  
 Handle with quick coupling, with torque limiter, 3.5Nm  
 Large handle, cannulated, quick coupling

**ART.-NO.**

IU 7835-56  
 IU 7707-35  
 IU 7706-00

- Select a locking screw (blue) of the proper length. Loosely insert the screw using the screwdriver T25 manually or under power with a low speed. Stop insertion when the screw head approaches the plate surface.

◆ **NOTE:**

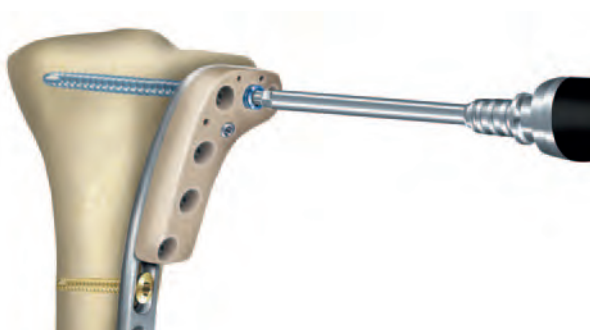
Ensure proper alignment of the screwdriver and that the screwdriver tip is fully seated in the screw head.

- Finish the screw manually using the screwdriver bit T25 with the torque limiting handle 3.5 Nm. Optimal locking should be achieved with an audible and tactile click of the torque limiter.

◆ **CAUTION:**

As soon as the head of the screw reaches the plate hole, it is compulsory to switch to the torque limiter.

- Alternatively, insert a non-locking cortical screw  $\varnothing 4.5$  mm (see section "Insertion of cortical screws (gold)").
- Follow these instructions to insert further screws in the metaphyseal plate holes, depending on the fracture pattern. Finally, confirm that all screw heads are flush with the plate surface. Check the result using fluoroscopy and adjust screw positioning or length as necessary.



# Insertion of locking compression screws (red) without compression



## INSTRUMENTS

Drill guide for gliding hole LOQTEQ® 4.5, I-ø3.9, red  
Twist drill ø3.8, L 180, coil 50, quick coupling, single use  
Twist drill ø3.8, L 250, coil 50, quick coupling, single use  
Depth gauge for screws ø4.5 – 6.5, up to L 100  
Stop ring for depth measurement, LF  
Screwdriver Duo, T25, quick coupling  
Handle with quick coupling, with torque limiter, 3.5Nm  
Large handle, cannulated, quick coupling

## ART.-NO.

IU 8167-10  
IU 7438-18-1U  
IU 7438-25-1U  
IS 7905-20  
IU 8184-03  
IU 7835-56  
IU 7707-35  
IU 7706-00

## ◆ NOTE:

If a combination of non-locking and locking screws is used, non-locking screws must be inserted first.

- Insert a drill guide (red) into any chosen gliding hole and drill to the desired depth using a drill ø3.8 mm (blue/red).

## ◆ CAUTION:

The screwdriver duo is not intended for screwing the drill guide into the plate.

- The screw length can be read off the calibration of the drill or determined using the depth gauge, after the drill guide has been removed.
- The stop ring facilitates reading off the calibration when attached to the drill. Push it down to the drill guide and remove the drill for reading the drilling depth in the gap of the ring.

## ◆ NOTE:

The screwdriver duo facilitates manual removal of the drill guide.

- Select a locking screw (red) of the proper length. Loosely insert the screw using the screwdriver T25 manually or under power with a low speed. Stop insertion when the screw head approaches the plate surface.

## ◆ NOTE:

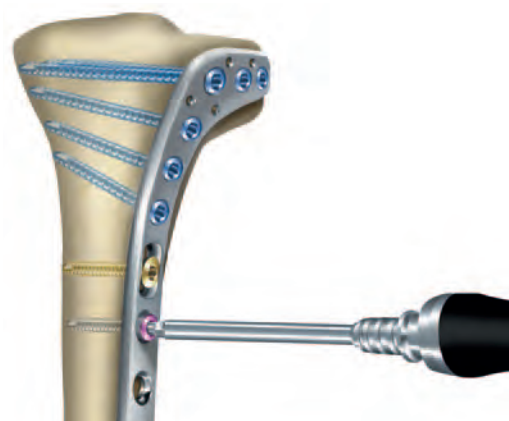
Ensure proper alignment of the screwdriver and that the screwdriver tip is fully seated in the screw head.

- Finish the screw manually using the screwdriver bit T25 with the torque limiting handle 3.5 Nm. Optimal locking should be achieved with an audible and tactile click of the torque limiter.

## ◆ CAUTION:

As soon as the head of the screw reaches the plate hole, it is compulsory to switch to the torque limiter. In cases of uncommonly hard bone, it may be necessary to finish the screw without the torque limiter to ensure the screw head is flush with the plate and the screw is locked.

- Alternatively, insert a non-locking cortical screw ø4.5 mm (see section "Insertion of cortical screws (gold)").



## Insertion of locking compression screws (red) with compression



### INSTRUMENTS

Basic Insert for load drill guide LOQTEQ® 4.5  
 Load drill guide LOQTEQ® 4.5, compression 1 mm  
 Load drill guide LOQTEQ® 4.5, compression 2 mm  
 Twist drill ø3.8, L 180, coil 50, quick coupling, single use  
 Twist drill ø3.8, L 250, coil 50, quick coupling, single use  
 Depth gauge for screws ø4.5 - 6.5, up to L 100  
 Screwdriver Duo, T25, quick coupling  
 Handle with quick coupling, with torque limiter 3.5Nm

### ART.-NO.

IU 8167-05  
 IU 8167-01  
 IU 8167-02  
 IU 7438-18-1U  
 IU 7438-25-1U  
 IS 7905-20  
 IU 7835-56  
 IU 7707-35

### OPTIONAL

Load drill guide LOQTEQ® 4.5, adjustable up to 2 mm

IU 8167-03



- LOQTEQ® gliding holes allow for fracture compression with subsequent locking fixation in one step. Load drill guides enable compressing fracture gaps of up to 2 mm.
- Screw the basic insert for load drill guides into a shaft hole near the fracture line or, if necessary, above the fracture line. Choose a load drill guide in accordance with the compression distance (1mm or 2mm), slide it on the basic insert and place the drill guide in the next plate hole, away from the fracture gap. Avoid pressure on the drill guide.

### ◆ CAUTION:

The screwdriver duo is not intended for screwing the basic insert into the plate.

- If available, use the adjustable load drill guide. The fracture gap serves as orientation in setting the compression distance (max. 2 mm) by turning the wheel of the load drill guide until an appropriate gap opens in the upper part of the instrument.

### ◆ NOTE:

Care should be taken when selecting the proper compression distance (1 mm or 2 mm). Avoid overcompression to ensure full locking of the screw, especially in hard bone.





- Drill to the desired depth using a drill  $\varnothing 3.8$  mm (blue/red) and remove the basic insert. The screw length can be read off the calibration of the drill or determined using the depth gauge, after the drill guide has been removed.

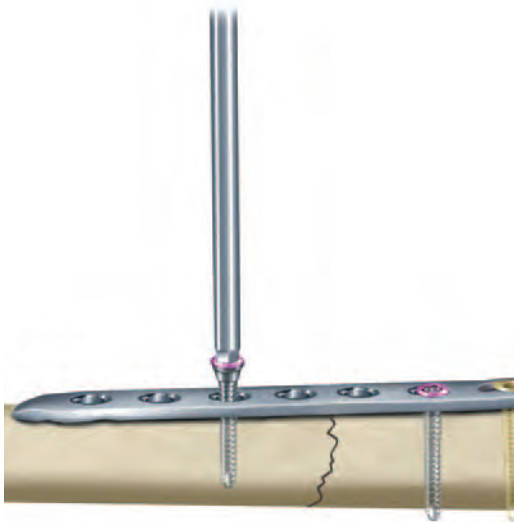
◆ **NOTE:**

The screwdriver duo facilitates manual removal of the basic insert.

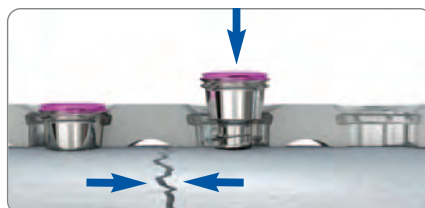
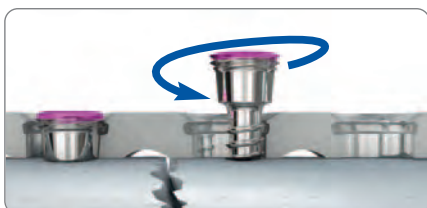
- Select a locking screw (red) of the proper length. Loosely insert the screw using the screwdriver T25 manually or under power with a low speed. Stop insertion when the screw head approaches the plate surface. Finish the screw manually using the screwdriver bit T25 with the torque limiting handle 3.5 Nm. Optimal locking should be achieved with an audible and tactile click of the torque limiter.

◆ **CAUTION:**

As soon as the head of the screw reaches the plate hole, it is compulsory to switch to the torque limiter. In cases of uncommonly hard bone, it may be necessary to finish the screw without the torque limiter to ensure the screw head is flush with the plate and the screw is locked.



- Alternatively, insert a non-locking cortical screw (gold) as a compression screw by placing the double drill guide without pressure in an off-center position in the plate hole. For insertion of the screw, follow the instructions on page 6.
- Follow these instructions to insert further screws in the plate holes depending on the fracture pattern. Finally, confirm that all screw heads are flush with the plate surface. Check the result using fluoroscopy and adjust screw positioning or length as necessary.



**INSTRUMENTS**

Explanation screwdriver, T25, round handle

**ART.-NO.**

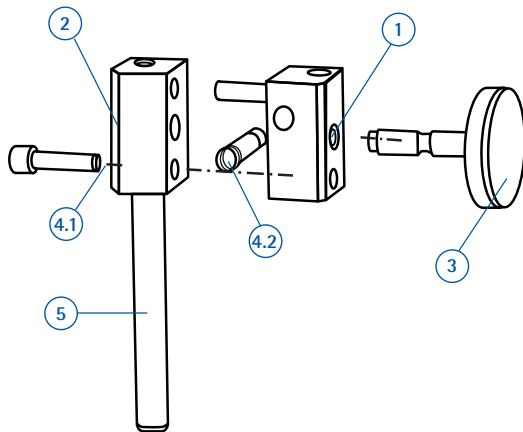
IU 7811-25

◆ **NOTE:**

The screwdrivers T25 (IU 7835-56) in the set are self-retaining and should not be used for screw explantation.

- Use the corresponding explantation screwdriver for safe removal of a screw. Explantation screwdrivers are not self-retaining, penetrate further into the screw head and thus permit a higher torque when removing screws. They are not included in the set as standard and must be ordered separately.
- Place an incision on the old scar. Manually undo all screws and sequentially remove them. After manually unlocking all screws, removal may be performed using a power tool.

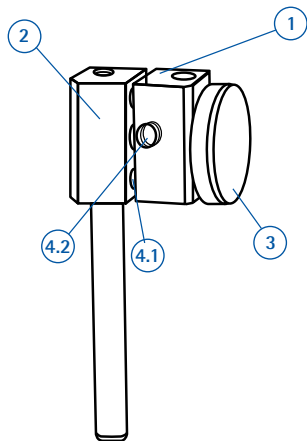
## Disassembly



### Adjustable load drill guide (IU 8167-03)

- Remove screws (item 4.1 and 4.2) using a hexagonal screwdriver 2.5
- Unscrew the set screw (item 3)
- Pull the compression block apart (items 1 and 2)

## Assembly



- Fit together the compression block (items 1 and 2)
- Insert the set screw (item 3) into the compression block, middle hole
- Insert the retaining screws (items 4.1 and 4.2) using a hexagonal screwdriver 2.5









## LOQTEQ® Proximal Lateral Tibia Plate 4.5

HOLES	LENGTH (mm)	LEFT	RIGHT
3/5	95	PA 4532-05-2	PA 4531-05-2
3/6	113	PA 4532-06-2	PA 4531-06-2
3/8	149	PA 4532-08-2	PA 4531-08-2
3/10	185	PA 4532-10-2	PA 4531-10-2
3/12	221	PA 4532-12-2	PA 4531-12-2
3/14	257	PA 4532-14-2	PA 4531-14-2

**LOQTEQ® Cortical Screw 4.5,  
T25, self-tapping**



L 14	SK 4525-14-2
L 16	SK 4525-16-2
L 18	SK 4525-18-2
L 20	SK 4525-20-2
L 22	SK 4525-22-2
L 24	SK 4525-24-2
L 26	SK 4525-26-2
L 28	SK 4525-28-2
L 30	SK 4525-30-2
L 32	SK 4525-32-2
L 34	SK 4525-34-2
L 36	SK 4525-36-2
L 38	SK 4525-38-2
L 40	SK 4525-40-2
L 42	SK 4525-42-2
L 45	SK 4525-45-2
L 50	SK 4525-50-2
L 55	SK 4525-55-2
L 60	SK 4525-60-2
L 65	SK 4525-65-2
L 70	SK 4525-70-2
L 75	SK 4525-75-2
L 80	SK 4525-80-2
L 85	SK 4525-85-2
L 90	SK 4525-90-2

**LOQTEQ® Cortical Screw 4.5,  
small head, T25, self tapping**



L 14	SK 4526-14-2
L 16	SK 4526-16-2
L 18	SK 4526-18-2
L 20	SK 4526-20-2
L 22	SK 4526-22-2
L 24	SK 4526-24-2
L 26	SK 4526-26-2
L 28	SK 4526-28-2
L 30	SK 4526-30-2
L 32	SK 4526-32-2
L 34	SK 4526-34-2
L 36	SK 4526-36-2
L 38	SK 4526-38-2
L 40	SK 4526-40-2
L 42	SK 4526-42-2
L 45	SK 4526-45-2
L 50	SK 4526-50-2
L 55	SK 4526-55-2
L 60	SK 4526-60-2
L 65	SK 4526-65-2
L 70	SK 4526-70-2
L 75	SK 4526-75-2
L 80	SK 4526-80-2
L 85	SK 4526-85-2
L 90	SK 4526-90-2

**Cortical Screw 4.5,  
T25, self-tapping**



L 20	SK 4514-20-2
L 22	SK 4514-22-2
L 24	SK 4514-24-2
L 26	SK 4514-26-2
L 28	SK 4514-28-2
L 30	SK 4514-30-2
L 32	SK 4514-32-2
L 34	SK 4514-34-2
L 36	SK 4514-36-2
L 38	SK 4514-38-2
L 40	SK 4514-40-2
L 42	SK 4514-42-2
L 45	SK 4514-45-2
L 50	SK 4514-50-2
L 55	SK 4514-55-2
L 60	SK 4514-60-2
L 65	SK 4514-65-2
L 70	SK 4514-70-2
L 75	SK 4514-75-2
L 80	SK 4514-80-2
L 85	SK 4514-85-2
L 90	SK 4514-90-2

**Washer**

I-ø 5.2 mm, A-ø 10.0 mm, Titan



SU 0510-00-2



Depth gauge for screws  $\varnothing 4.5 - 6.5$ , up to L 100

IS 7905-20



Twist drill  $\varnothing 3.2$ , L 195, coil 50, quick coupling

IU 7432-30

Twist drill  $\varnothing 3.8$ , L 180, coil 50, quick coupling

IU 7438-18

Twist drill  $\varnothing 3.8$ , L 250, coil 50, quick coupling

IU 7438-25

Twist drill  $\varnothing 4.5$ , L 145, coil 50, quick coupling

IU 7445-00



Large handle, cannulated, quick coupling

IU 7706-00



Handle with quick coupling, with torque limiter 3.5Nm

IU 7707-35



Screwdriver Duo, T25, quick coupling

IU 7835-56



Double drill guide  $\varnothing 3.2/4.5$ , with spring aided centering

IU 8117-50



Load drill guide LOQTEQ® 4.5, compression 1mm	IU 8167-01
Load drill guide LOQTEQ® 4.5, compression 2mm	IU 8167-02
Load drill guide LOQTEQ® 4.5, adjustable up to 2mm	IU 8167-03
Basic insert for load drill guide LOQTEQ® 4.5	IU 8167-05



Drill guide for gliding hole LOQTEQ® 4.5, I-ø 3.9, red	IU 8167-10
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Reduction sleeve for K-wire ø2.0	IU 8167-15
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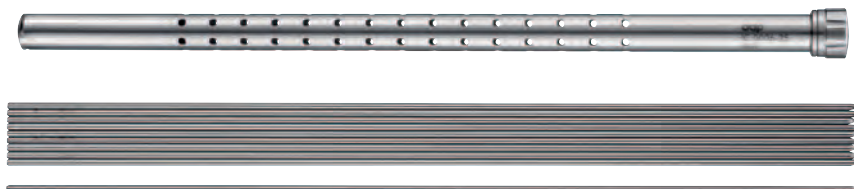
Drill guide for round hole LOQTEQ® 4.5, I-ø 3.9, blue	IU 8167-20
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Aiming device LOQTEQ® Proximal Lateral Tibia Plate 4.5, R	IU 8173-01
Aiming device LOQTEQ® Proximal Lateral Tibia Plate 4.5, L	IU 8173-02
Fixing screw aiming device LOQTEQ® LFI T25	IU 8176-04



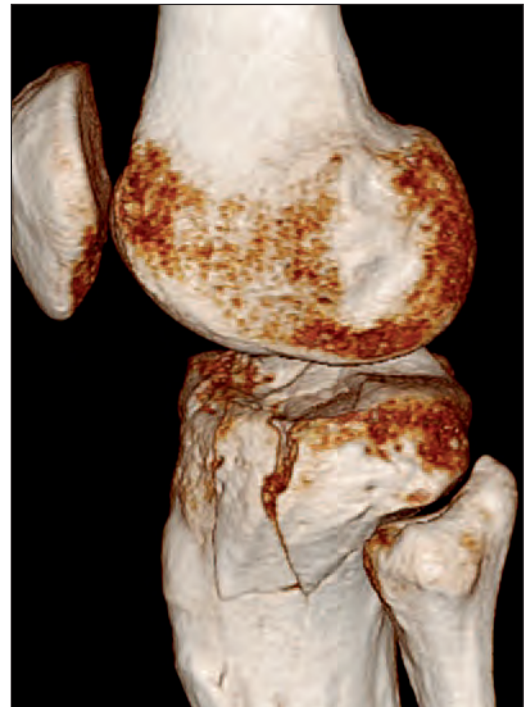
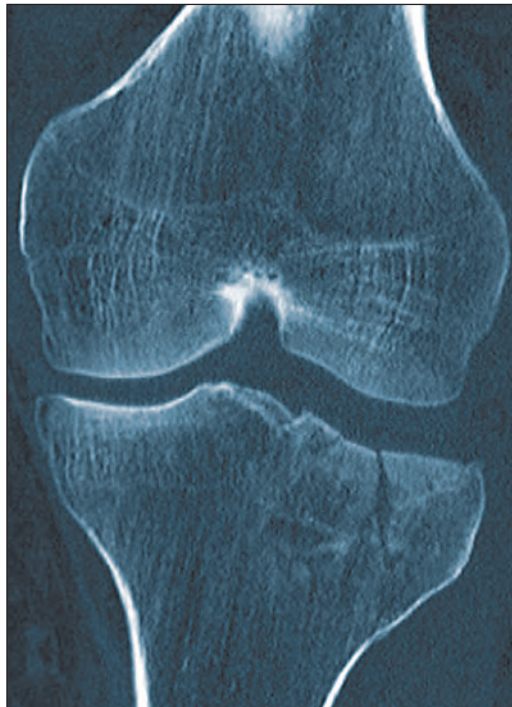
Stop ring for depth measurement, LF	IU 8184-03
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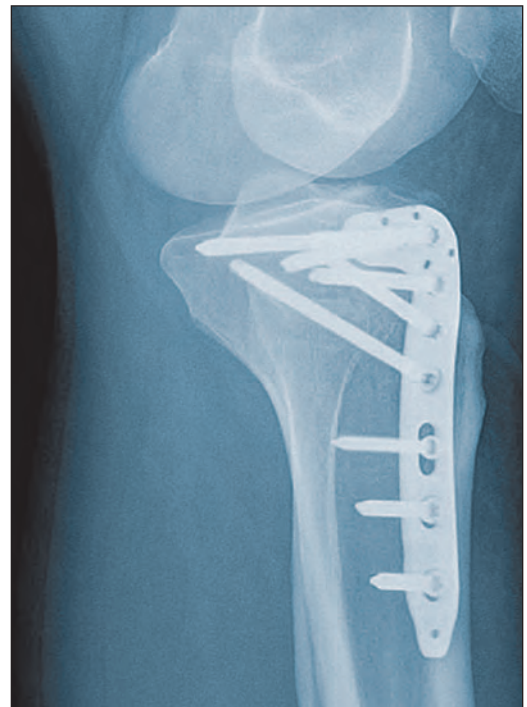
Aiming device LOQTEQ® Proximal Lateral Tibia Plate 4.5, R	IC 0006-25
Aiming device LOQTEQ® Proximal Lateral Tibia Plate 4.5, L	NK 0020-25

## Fracture of the Proximal Lateral Tibia (AO 41-B3.2)

### Preoperative



### Postoperative



Clinical case and CT images with the kind permission of  
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errors and misprints.

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