

LCP PROXIMAL LATERAL TIBIA PLATES WITH LISS INSTRUMENTATION

Surgical Technique



 Image intensifier control

This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

Processing, Reprocessing, Care and Maintenance

For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:

<http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance>

For general information about reprocessing, care and maintenance of DePuy Synthes reusable devices, instrument trays and cases, as well as processing of DePuy Synthes non-sterile implants, please consult the Important Information leaflet (SE_023827) or refer to:

<http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance>

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LCP Proximal Lateral Tibia Plates with LISS Instrumentation

Overview

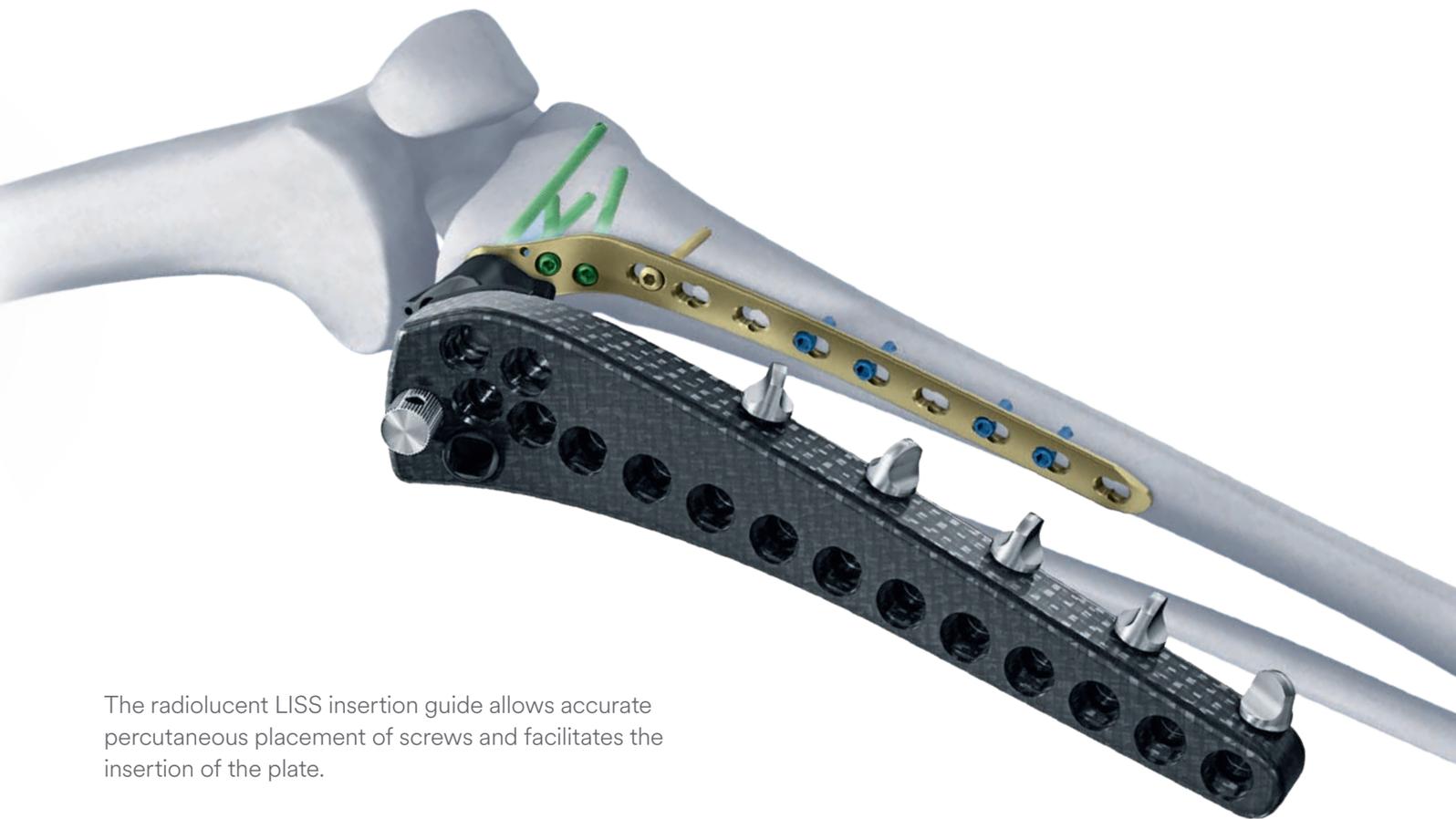
Available plates

- PLT with combi-holes in the shaft
- Left and right versions
- Five lengths with 5, 7, 9, 11 and 13 combi-holes in the shaft
- Available in stainless steel and Titanium Alloy (TAN)

▲ Precaution:

Excessive and repetitive bending is not recommended as it may weaken the plate.

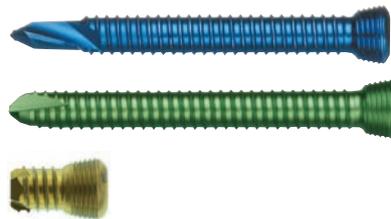




The radiolucent LISS insertion guide allows accurate percutaneous placement of screws and facilitates the insertion of the plate.

Locking screws

- Self-drilling locking screws in different lengths
- Self-tapping locking screws in different lengths
- Locking screws with blunt tip for periprosthetic fractures
- All screws with Stardrive or Hex drive
- Available in stainless steel and Titanium Alloy (TAN)



LISS instrumentation for Stardrive and Hex drive

The torque-limiting screwdriver, the screwdriver shaft and the cleaning instrument are available for screws with Stardrive and Hex drive.



Guiding Block

The guiding block facilitates mounting of the threaded LCP drill sleeves.



Intended Use, Indications and Contraindications can be found in the corresponding system Instructions for Use.

The AO Principles of Fracture Management

Mission

The AO's mission is promoting excellence in patient care and outcomes in trauma and musculoskeletal disorders.

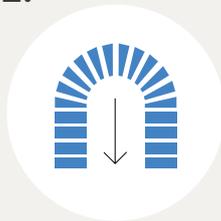
AO Principles^{1,2}

1.



Fracture reduction and fixation to restore anatomical relationships.

2.



Fracture fixation providing absolute or relative stability, as required by the “personality” of the fracture, the patient, and the injury.

3.



Preservation of the blood supply to soft-tissues and bone by gentle reduction techniques and careful handling.

4.



Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.

¹ Müller ME, M Allgöwer, R Schneider, H Willenegger. Manual of Internal Fixation. 3rd ed. Berlin, Heidelberg, New York: Springer. 1991

² Buckley RE, Moran CG, Apivatthakakul T. AO Principles of Fracture Management: 3rd ed. Vol. 1: Principles, Vol. 2: Specific fractures. Thieme; 2017.

Preoperative Planning

Use an antero-posterior as well as a lateral x-ray image of the injured limb and an image of the knee joint. X-ray images of the other limb might be useful for comparison.

Complete the preoperative radiographic assessment and prepare the preoperative plan. Determine plate length and instrument to be used.

Preoperative planning of lag screws may be necessary.

■ Notes:

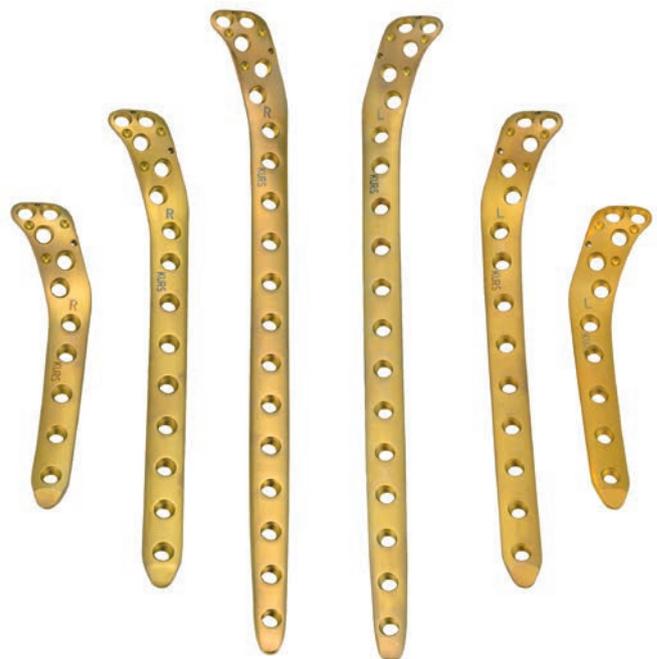
The screws in holes A and C point towards the articular surface of the knee. For hole A, the tip of a 40 mm long screw and for hole C, the tip of a 75 mm long screw will lie approximately at the same level as the top of the plate.

▲ Precaution:

Plate bending is not recommended as this may weaken the plate and the plate-screw interface and can compromise the targeting function of an aiming arm, if in use. However, there may be cases in which plate bending is clinically necessary. In such cases, only bend the plate incrementally and between screw holes using the plate bending press (329.300), and never bend back-and-forth. Insert at least one screw distal to the bend.

■ Note:

The LISS instruments are compatible with both LISS PLT and LCP PLT plates. This surgical technique shows the technique with LCP PLT plates only. For your reference a picture of a LISS PLT plate is shown on the right.



Preparation

1. Prepare required sets

Sets

●	01.120.040	Set for LISS Instruments and Insertion Handle, for DF and PLT Plates
	or	
●	01.120.041	Set for LISS Instruments Stardrive and Insertion Handle, for DF and PLT Plates
	01.120.412	Plate Set LCP PLT 4.5/5.0 (Stainless Steel)
	or	
	01.120.414	Plate Set LCP PLT 4.5/5.0 (Titanium Alloy/TAN)
	01.200.011	Locking Screws Ø 5.0 mm and Standard Screws Ø 4.5/6.5 mm (Stainless Steel) in Sterilizing Tray
	or	
●	01.200.012	Locking Screws Ø 5.0 mm and Standard Screws Ø 4.5/6.5 mm (Titanium) in Sterilizing Tray
	or	
●	01.200.013	Locking Screws Stardrive Ø 5.0 mm and Standard Screws Ø 4.5/6.5 mm (Stainless Steel) in Sterilizing Tray
	or	
	01.200.014	Locking Screws Stardrive Ø 5.0 mm and Standard Screws Ø 4.5/6.5 mm (TAN) in Sterilizing Tray

Optional set

01.120.457	Large Fragment Instrument Set
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Power Tools

511.701	Compact Air Drive
	or
530.100	Power Drive
	or
511.750	Quick Coupling
	or
511.790	Quick Coupling for Kirschner Wires

2. Position the patient

Position the patient supine on a radiolucent table. The leg should be freely movable. The contralateral leg can be placed in an obstetric leg holder.

Ensure that both a lateral and AP x-ray of the proximal tibia can be obtained in this position.

Support the knee with towels to flex it into the appropriate position.

■ Note:

The use of a fracture table has not proven to be very helpful.

▲ Precautions:

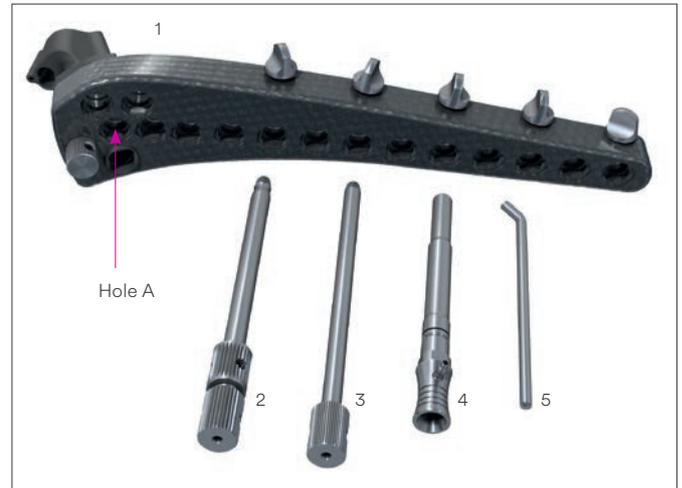
- Instruments and screws may have sharp edges or moving joints that may pinch or tear user's glove or skin.
- Handle devices with care and dispose worn bone cutting instruments in an approved sharps container.



3. Assemble the insertion instruments

Instruments

324.003 or 324.004	LISS Insertion Guide for Proximal Tibia, left LISS Insertion Guide for Proximal Tibia, right	1
324.043	Fixation Bolt for LISS Insertion Guide	2
324.044	Stabilization Bolt for LISS Insertion Guide	3
324.022	Drill Sleeve for LISS Insertion Guide	4
321.170	Pin Wrench \varnothing 4.5 mm	5



Note:

In certain cases (e.g. proximal fracture treated with a short plate) it may be advantageous to do the surgery without using the LISS insertion guide and the corresponding LISS instruments. Then, screws can be inserted by applying the technique described in the surgical technique Locking Compression Plate (LCP).

Insert the fixation bolt in hole A of the insertion guide.

Place the insertion guide on the three-point locking mechanism of the plate.

Thread the fixation bolt into the plate. Thread the nut of the fixation bolt and lightly tighten it with the pin wrench.

For a stable fixation between the plate and the insertion guide during insertion, introduce the stabilization bolt with the drill sleeve through hole C and thread it into the plate.

Notes:

- To potentially prevent tissue ingrowth and facilitate implant removal, close the unoccupied screw holes by means of screw hole inserts prior to inserting the plate. Use the torque-limiting screwdriver. The optimum torque is reached after one click.
- If desired, insert a stabilization bolt with the insertion sleeve into hole B or C for a more stable attachment of the plate to the insertion guide. This offers stability if there is resistance from soft tissue or fracture fragments during insertion.



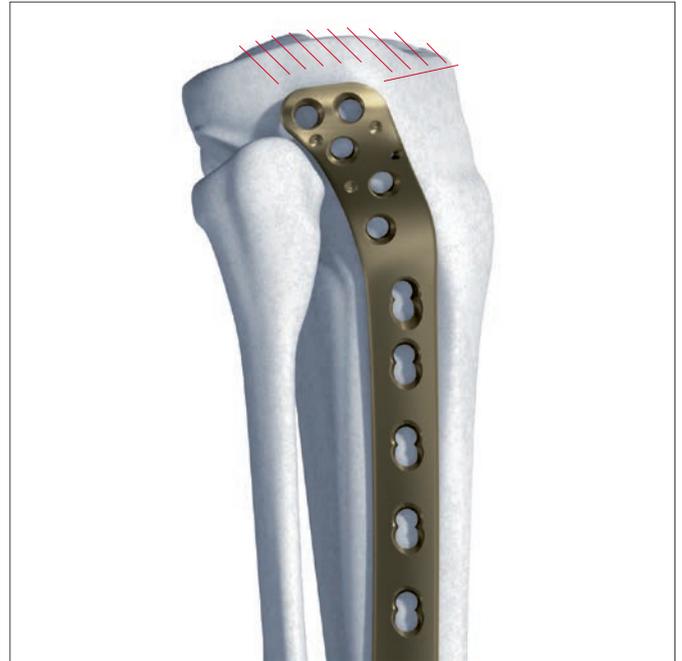
Hole A Hole C

4. Reduce the fracture

If the fracture is intra-articular, first reconstruct and stabilize the whole joint. Use lag screws to achieve compression between the articular fragments. Cannulated screws may support reduction.

Take care to ensure that these additional screws do not collide with the locking screws inserted through the insertion guide. The figure shows the possible zone for lateral lag screws in the condyle.

- ① The fracture can be aligned manually by traction, with a temporary knee-bridging external fixator or with a distractor. Intra-operative x-ray or image-intensifier control is recommended to check reduction.



The red hatched area indicates the possible zone for lag screws.

5. Surgical approaches

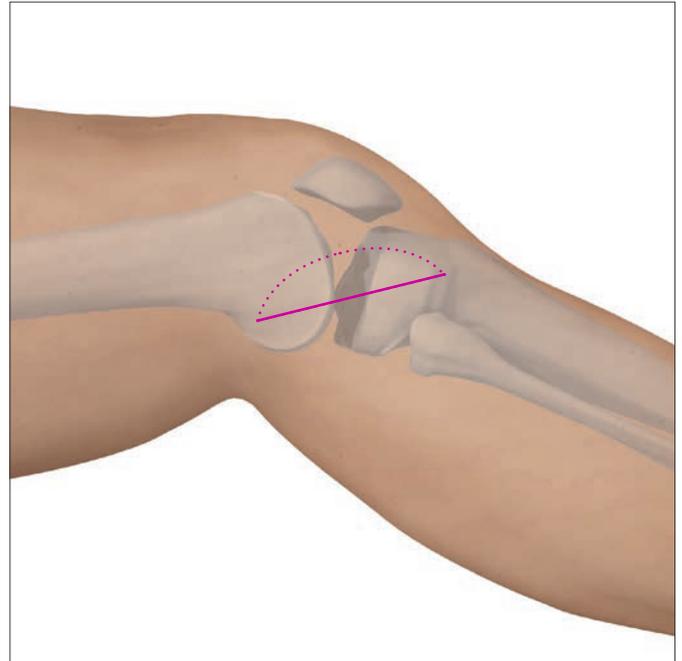
Depending on requirements, it is possible to perform either a curved (120° hockey stick) or a straight skin incision from Gerdy's tubercle about 50 mm in a distal direction (see figure).

Approximately half a centimeter from the tibial ridge, detach the anterior tibial muscle from the bone, retract it and insert the plate in the space between the periosteum and the muscle. To allow correct positioning of the proximal part of the plate, it is important to adequately dissect the muscle attachment site.

For complex intra-articular fractures, an anterolateral arthrotomy that provides good control of the reduction may be preferred.

▲ Precaution:

The incision can be extended if necessary to improve visualization of the articular surface or lateral metaphysis and diaphysis. It may not always be appropriate to use limited incisions and closed reduction techniques.



Lateral approach: straight (full line) or curved incision (dashed line).

Plate Insertion

1. Insert LISS

Instruments

Assembled Insertion Guide

324.027 Trocar, length 162 mm, for No. 324.022

Insert the plate between the anterior tibial muscle and the periosteum.

Slide the plate in the distal direction with its distal end in constant contact with the bone. Position the proximal end of the plate against the lateral condyle. Carefully find the correct position of the plate on the condyle.

Check that the plate is positioned properly, distally on the anterolateral side of the tibia and proximally on the lateral condyle.

The plate must lie flat against the condyle. Due to its weight, the insertion guide has a tendency to tilt dorsally. Should it be problematic to find the correct position of the plate on the condyle, further release the proximal soft tissues by increasing the opening.

▲ Precaution:

The screw in hole D is oriented towards the posterior side of the medial condyle. Excessive internal rotation of the insertion guide must therefore be avoided as this screw might endanger the popliteal artery.

■ Note:

It is recommended that the plate be inserted with the distal tip sliding along the tibial crest. This allows for visual clues or palpation of the plate's progress. It also prevents migration of the plate posterior into neurovascular structures.



Once the plate is properly aligned with the bone, remove the drill sleeve and the stabilization bolt from hole C. Insert the trocar in the drill sleeve through the most distal hole of the plate. Perform a stab incision and insert the drill sleeve and the trocar down to the plate. Check the correct position of the distal part of the plate, either with the image intensifier or by direct palpation.

Secure the position of the drill sleeve with the fixation screw of the insertion guide. Replace the trocar with the stabilization bolt. Thread the stabilization bolt into the plate to close the frame.

Notes:

- When using a 13 hole plate, perform a careful soft tissue dissection down to the plate for holes 10 to 13 before inserting the trocar and drill sleeve, in order to visualize the superficial peroneal nerve. Alternatively, it is also possible to perform a blunt dissection from ventral to dorsal to avoid the superficial peroneal nerve.
- Due to soft tissues around the stabilization bolt, it will be difficult to change the position of the plate/handle assembly once the bolt has been inserted.



2. Fixate LISS temporarily with Kirschner wires

Instrument

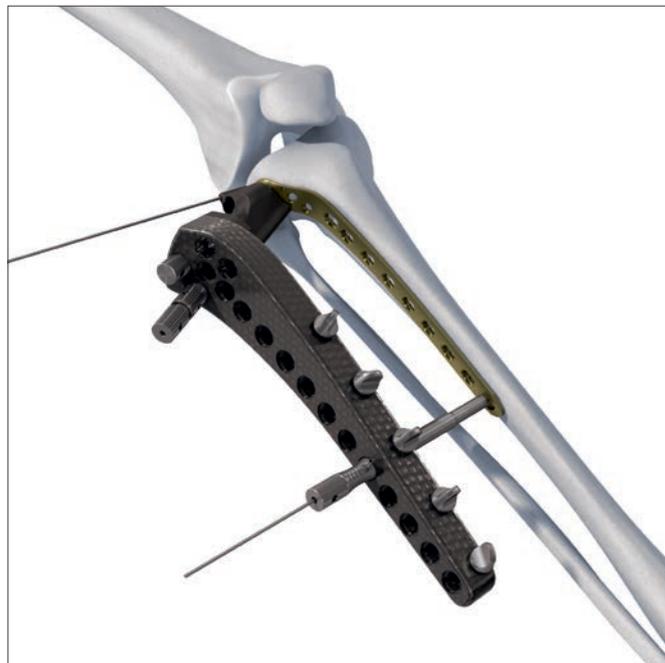
292.699	Kirschner Wire Ø 2.0 mm with threaded tip
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For preliminary fixation of the plate, use a 2.0 mm Kirschner wire through the most proximal Kirschner wire hole of the insertion guide (guided only through the aluminium foot part of the insertion guide) and through the stabilization bolt.

Carefully check the position of the plate and the length of the reduced injured limb. Once the reduction has been successfully completed and the plate has been positioned correctly, the locking screws can be inserted.

■ Note:

Alternatively, or in addition, a Kirschner wire may be placed through the fixation bolt for preliminary plate fixation.



Alternative technique

Instruments

324.048	Aiming Device for Kirschner Wires, for LISS Insertion Guide
324.034	Centering Sleeve for Kirschner Wire, length 184 mm, for No. 324.048
292.699	Kirschner Wire \varnothing 2.0 mm with threaded tip

If necessary, it is possible to use 2.0 mm Kirschner wires for the preliminary fixation on both sides of the plate. Use the aiming device for Kirschner wires to insert the wires on the ventral and dorsal side of the plate. The distance between bone and plate should be kept as short as possible when inserting the wires, as they are convergent. After the insertion of the Kirschner wires, the distance between plate and bone can no longer be reduced.

After removing the Kirschner wire sleeves and the aiming device, proximal/distal displacement and adjustment of the position of the plate can be carried out. At the same time, the lateral Kirschner wires prevent the plate from migrating into the sagittal plane. Once the correct position is determined, the plate can be locked temporarily with a Kirschner wire through the fixation bolt.

■ Note:

The aiming device can be used from hole 3 to hole 13.



Option A: Insertion of Self-drilling, Monocortical Locking Screws

Screw placement depends on the type of fracture. The position of the screws should be chosen in accordance with established biomechanical principles for internal fixation. The screws should be inserted close to and remote from the fracture gap in the main fragments. Use at least four screws per fracture side.

Length and rotation are defined as soon as one screw has been inserted in each main fragment. Ante- and recurvatum deformities can still be adjusted, but varus or valgus deformities can hardly be corrected. For this reason, it is recommended to start inserting the first screw in the proximal fragment.

■ Note:

If a screw has to be removed and reinserted, use the torque-limiting screwdriver and not the power tool.

1. Make stab incision

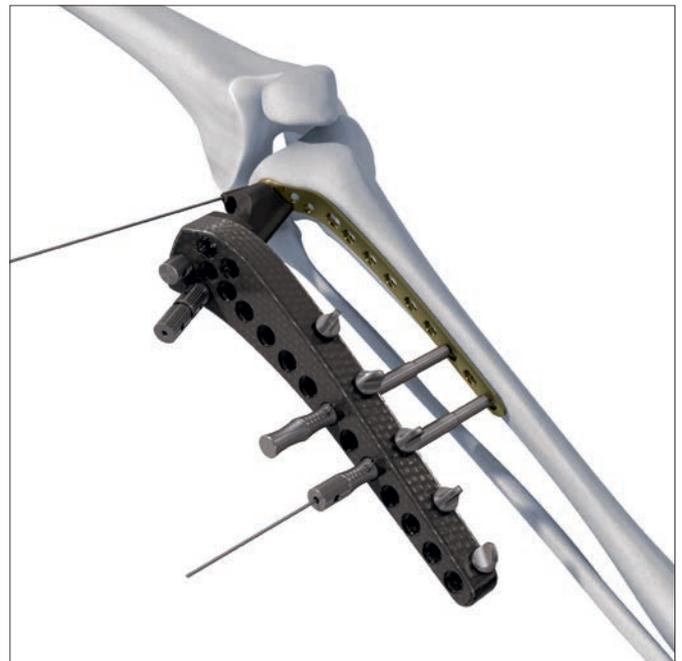
Instruments

324.022	Drill Sleeve for LISS Insertion Guide
324.027	Trocar, length 162 mm, for No. 324.022

Make a stab incision and insert the trocar through the drill sleeve.

■ Note:

Due to the close proximity of holes D and E in the insertion guide, insertion sleeves cannot be placed in both holes at the same time.



2. Determine screw length

Instruments

324.055	Centering Sleeve for Kirschner Wires
324.037	LISS Measuring Device for Kirschner Wires
292.699	2.0 mm Kirschner wire, length 280 mm

To determine the length of the condylar screws, use the measuring device with a 2.0 mm Kirschner wire, placed through the centering sleeve in the drill sleeve.

- Using image intensification, insert the Kirschner wire to the desired depth leaving at least 5 mm between the tip of the Kirschner wire and the medial cortex. Measure the screw length over the Kirschner wire using the measuring device for Kirschner wires, leaving the centering sleeve in place, and round down to the nearest screw length. This will ensure that the tip of the screw will not protrude through the medial cortex.



■ Note:

To improve the visualization of the condyle, the drill sleeves for the two most proximal holes (holes D and E) are guided through the aluminium foot part of the insertion guide only. To prevent rotation of the drill sleeve, it is therefore necessary to hold it with two fingers during insertion and removal of the Kirschner wire as well as during insertion and removal of the two most proximal screws.

- 🕒 Orient the C-arm obliquely in order to visualize correctly where the Kirschner wire exits from the anteromedial or posteromedial cortex.

Use screws of 26 mm or 18 mm length in the shaft region.

Options:

- In case of very thick cortex, pre-drill by using the Pulling Device (324.033) or the Drill Bit \varnothing 4.3 mm (310.423).
- The insertion of the initial screw tends to push the bone medially. See Option: Pulling Device (“Whirly Bird”) section for details on how to use the pulling device for these situations.

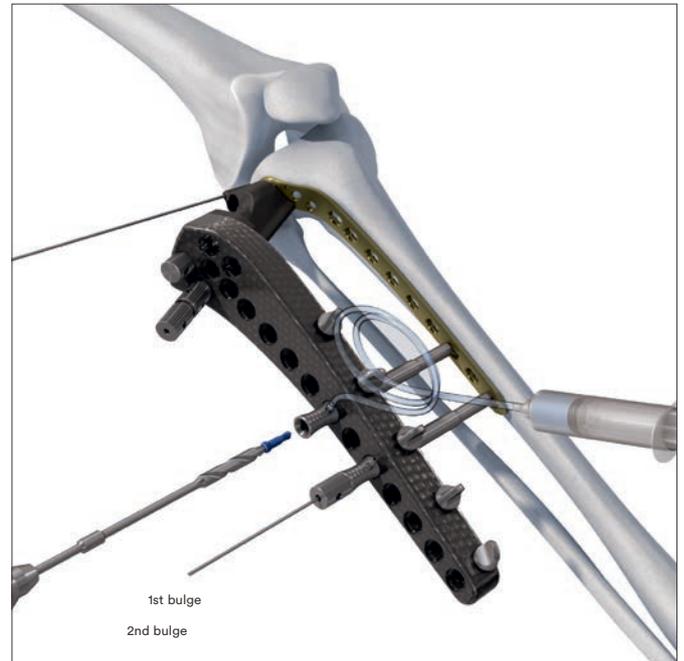
3. Insert self-drilling locking screws

Instruments

511.771	Torque Limiter, 4 Nm
● 324.050 or 324.250	Screwdriver Shaft 3.5, hexagonal, length 158 mm Screwdriver Shaft Stardrive, T25, length 158 mm
● 324.052 or ● 314.163	Torque-limiting Screwdriver 3.5, hexagonal Torque-limiting Screwdriver Stardrive, T25
324.019	Stopper

To insert the locking screw using a power tool, fit a torque limiter to the power tool and insert the screwdriver shaft into the torque limiter.

Insert the locking screw into the plate hole through the drill sleeve for LISS insertion guide. To insert the screw, start the power tool slowly, increase the speed and then reduce it again before the screw is fully tightened. Advance the screw into the bone until the second bulge of the screwdriver disappears in the drill sleeve.

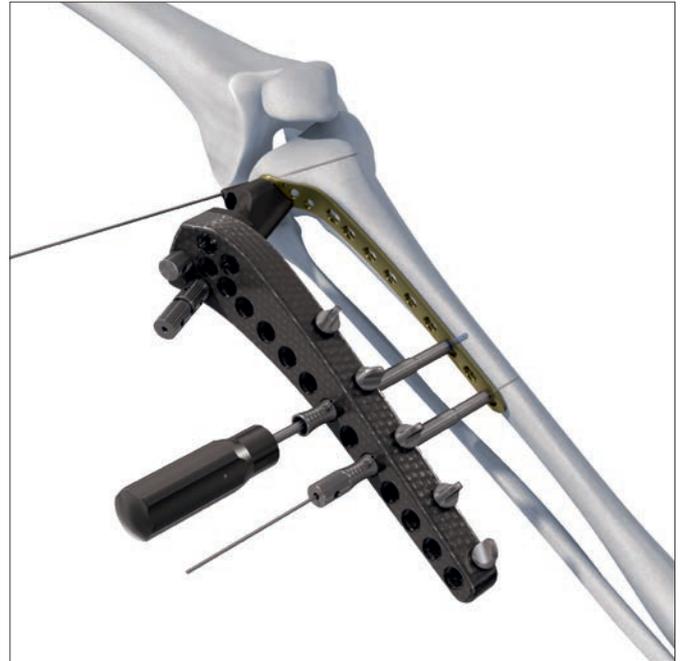


Tighten the screw manually with the torque-limiting screwdriver. The optimum torque is reached after one click.

Insert a stopper into the LISS insertion guide after screw insertion.

■ **Notes:**

- Do not lock the screws at full speed to reduce the risk of stripping the screw head. This can make it difficult to remove the implant.
- In order to achieve an excellent interface between screw and bone and to prevent a medial migration of the bone, use the power tool without high axial forces (3 to 5 kg).
- To prevent heat necrosis, it is important to cool the screw with saline solution during the drilling procedure through the drill sleeve.
- If the screw is difficult to insert or stops advancing prior to locking to the plate, remove the screw and clean the cutting flutes using a Kirschner wire. The screw can be re-used if the socket has not been damaged.
- Should the screwdriver be difficult to remove after insertion, disconnect it from the power tool and remove the drill sleeve. After reconnecting the screwdriver to the power tool, withdraw the screwdriver from the screw.



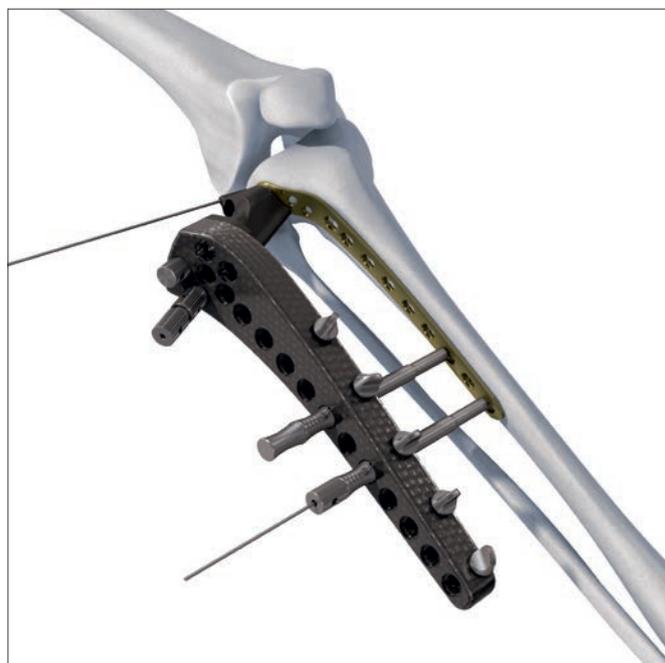
Option B: Insertion of Self-tapping, Bicortical Locking Screws

1. Make stab incision

Instruments

324.022	Drill Sleeve for LISS Insertion Guide
324.027	Trocar, length 162 mm, for No. 324.022

Make a stab incision and insert the trocar through the drill sleeve for LISS insertion guide.



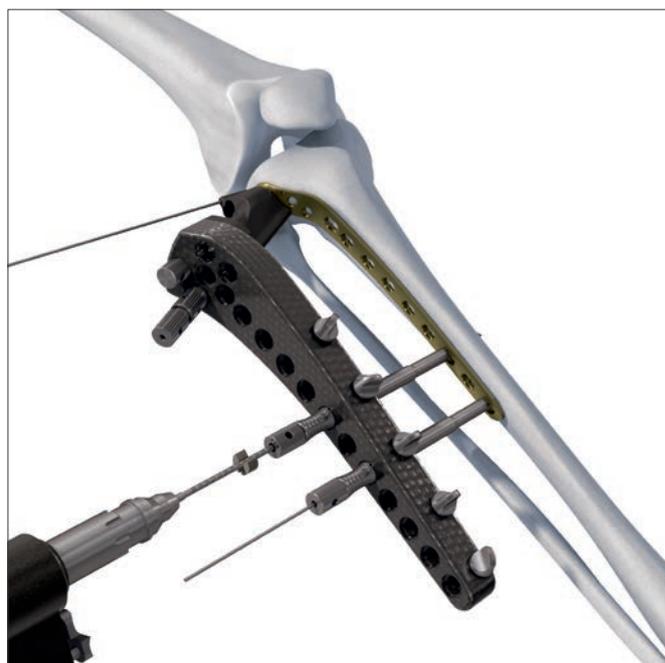
2. Predrill screw hole

Instruments

324.007	Drill Sleeve 7.2/4.3, length 130 mm
310.423	Drill Bit \varnothing 4.3 mm, length 280 mm

Remove the trocar and thread the drill sleeve 7.2/4.3 into the plate hole through the drill sleeve for LISS Insertion guide.

Carefully drill the screw hole using the 4.3 mm drill bit.



3. Determine screw length

Slide the stop ring down to the drill sleeve to make reading easier.

Read the drilled depth directly from the laser mark on the drill bit. Remove both drill bit and drill sleeve 7.2/4.3.

Option:

The insertion of the initial screw tends to push the bone medially. See Option: Pulling Device (“Whirly Bird”) section for details on how to use the pulling device for these situations.



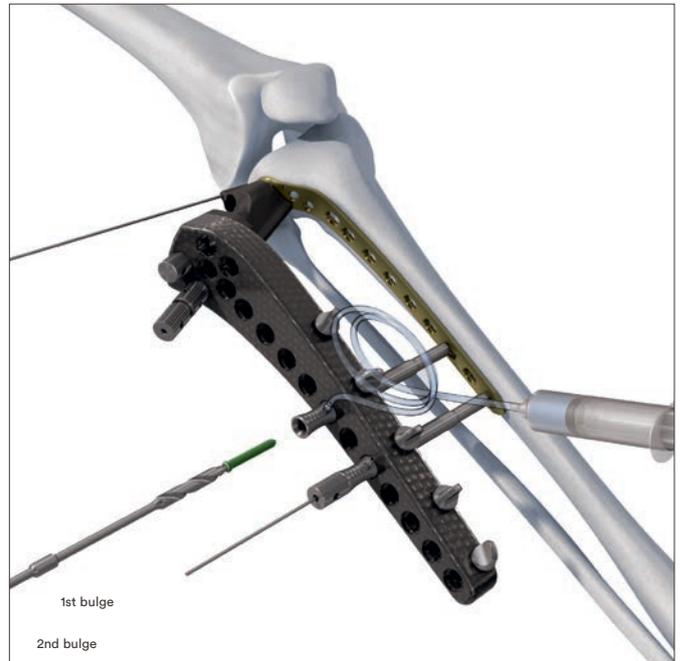
4. Insert self-tapping locking screws

Instruments

● 511.771	Torque Limiter, 4.0 Nm
324.050	Screwdriver Shaft 3.5, hexagonal or
● 324.250	Screwdriver Shaft Stardrive, T25
● 324.052	Torque-limiting Screwdriver 3.5, hexagonal or
● 314.163	Torque-limiting Screwdriver Stardrive, T25
324.019	Stopper

Choose a self-tapping locking screw according to the measured length. To insert the locking screw using a power tool, fit a torque limiter to the power tool and insert the screwdriver shaft into the torque limiter.

Insert the locking screw into the plate hole through the drill sleeve for LISS Insertion guide. To insert the screw, start the power tool slowly, increase the speed and then reduce it again before the screw is fully tightened. Advance the screw into the bone until the second bulge of the screwdriver disappears in the drill sleeve.

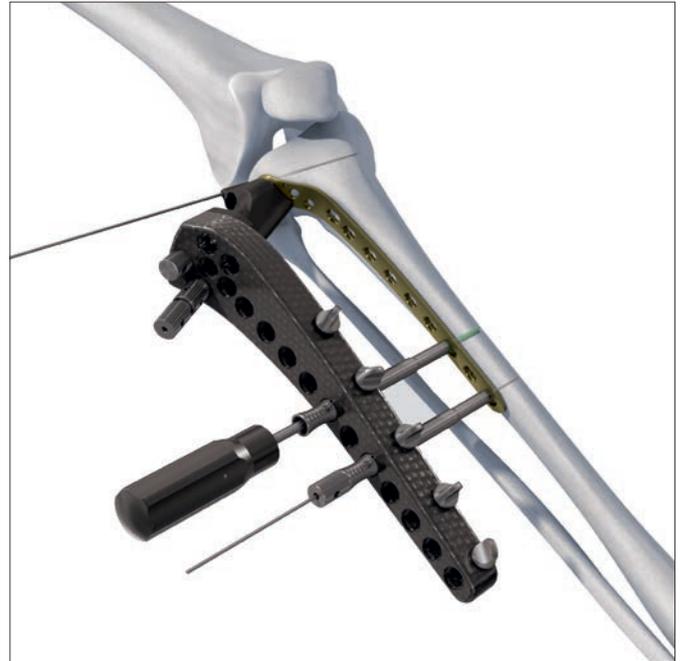


Tighten the screw manually with the torque-limiting screwdriver. After one click, the optimum torque is reached.

Insert a stopper into the LISS insertion guide after screw insertion.

▲ Precautions:

- To reduce the risk of stripping the screw head do not lock the screws at full speed. This can make it difficult to remove the implant.
- For long screws and thick cortical bone, ensure sufficient cooling during insertion.



Option: Manual insertion

Instruments

● 324.052	Torque-limiting Screwdriver 3.5, hexagonal
or	
314.163	Torque-limiting Screwdriver Stardrive, T25
◆ 324.019	Stopper

Insert and lock the screw with the torque-limiting screwdriver through the drill sleeve for LISS insertion guide.

Insert a stopper into the LISS insertion guide after screw insertion.

Option: Pulling Device (“Whirly Bird”)

Instruments

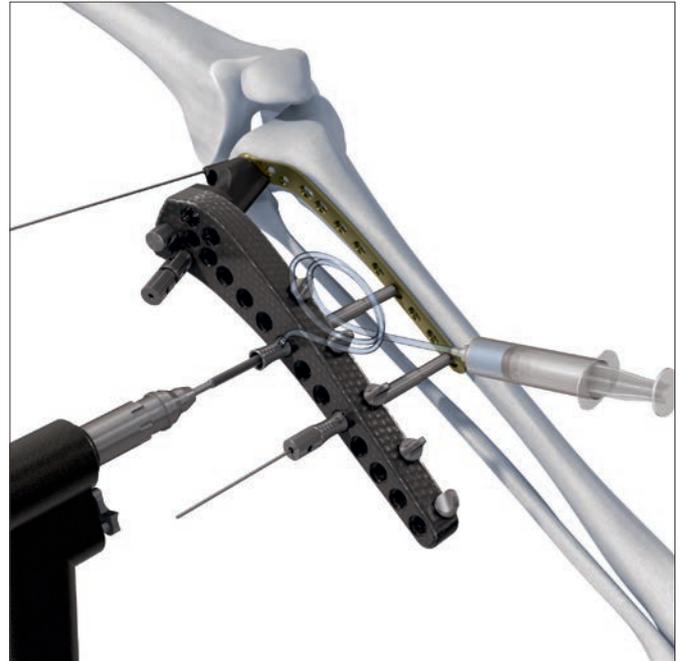
324.033	Pulling Device, length 240 mm
324.022	Drill Sleeve for LISS Insertion Guide

The insertion of the initial screw tends to push the bone medially.

Insert the pulling device without the knurled nut through the drill sleeve into the neighbouring hole of the first permanent screw.

Stop the power tool before the entire screw length of the pulling device is inserted.

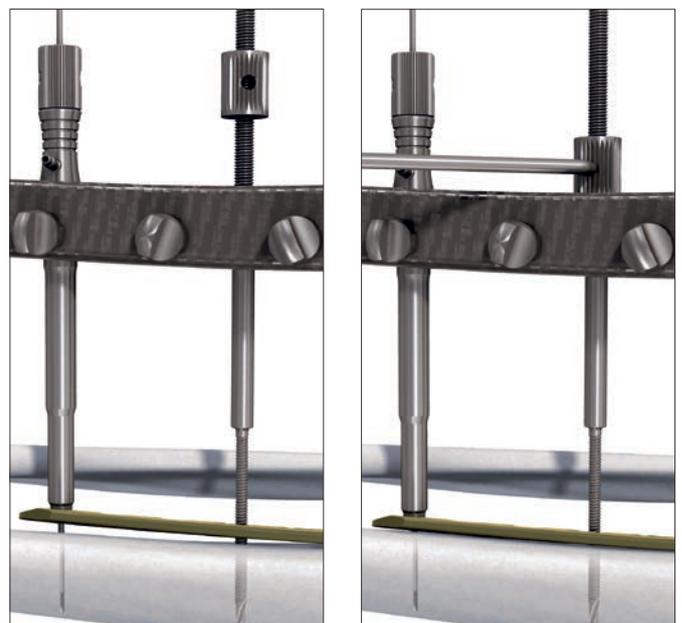
Remove the power tool and the drill sleeve.



Screwing the knurled nut onto the pulling device allows the bone to pull towards the plate. Since the tip of this instrument has a diameter of 4.0 mm, replacing it by a 5.0 mm locking screw still ensures good purchase in the bone.

▲ Precaution:

It is important to monitor the advance of the screw tip carefully when inserting the pulling device. Stop the power tool before the pulling device is seated on the plate. Failure to do so may result in stripping the thread in the bone.



Option: Guiding Blocks Using LCP Instrumentation

Option: Guiding Blocks Using LCP instrumentation

Refer to surgical technique LCP Locking Compression Plate.

Using LISS instrumentation

Use instruments as described in section plate insertion.

Using the guiding blocks for LCP DF

The guiding block facilitates mounting of the threaded LCP drill sleeves in the head of the plate.

Instruments

312.940	Guiding Block for LCP-PLT 4.5/5.0, right
312.941	Guiding Block for LCP-PLT 4.5/5.0, left
323.042	LCP Drill Sleeve 5.0, for Drill Bits Ø 4.3 mm
310.430	LCP Drill Bit Ø 4.3 mm with Stop, length 221mm, 2-flute, for Quick Coupling

■ Note:

If cortex screws are used they have to be inserted before mounting the guiding block and before inserting locking screws.

Instrument assembly

1.

Choose the matching guiding block and place it onto the plate head. Make sure that the three-point locking mechanism is positioned on the pre-contoured reference points of the plate.



2.

Insert a first LCP drill sleeve through the guiding block into the central hole (A) of the plate and tighten it.

3.

To lock the LCP drill sleeve tighten the locking nut of the guiding block by turning it clockwise.

4.

For preparing additional holes in the plate head insert LCP drill sleeves in the surrounding holes.

Predrilling and screw measurement

Pre-drill with the LCP drill bit \varnothing 4.3mm. Measure screw length by reading the drilled depth directly from the laser mark on the drill bit. To make reading easier shove the stop ring down to the drill sleeve.

Screw insertion

Remove the LCP drill sleeve. Insert the locking screw through the guiding block.

Implant Removal

Instruments

324.003 or 324.004	LISS Insertion Guide for Proximal Tibia, left LISS Insertion Guide for Proximal Tibia, right
324.043	Fixation Bolt for LISS Insertion Guide
324.022	Drill Sleeve for LISS Insertion Guide
324.044	Stabilization Bolt for LISS Insertion Guide
324.027	Trocar, length 162 mm, for No. 324.022
● 324.050 or ● 324.250	Screwdriver Shaft 3.5, hexagonal, length 158 mm Screwdriver Shaft Stardrive, T25, length 158 mm
● 324.052 or ● 314.163	Torque-limiting Screwdriver 3.5, hexagonal Torque-limiting Screwdriver Stardrive, T25

Remove the implant only after complete consolidation of the fracture. Remove in reverse order to the implantation.

First, make the incision for the insertion guide in the path of the old scar, and mount the insertion guide (see step 3 “Assemble the insertion instruments” and step 5 “Surgical approaches”).

Make stab incisions and use the torque-limiting screwdriver to unlock all screws manually. In a second step, completely remove all screws with a power tool.

■ Note:

If a 13 hole plate has to be removed, perform a careful soft-tissue dissection down to the plate for holes 10 to 13 before inserting the trocar and drill sleeve, in order to visualize the superficial peroneal nerve.

Option: Clean screw heads with cleaning instrument

Instruments

- | | |
|-----------|-------------------------------------|
| ● 324.053 | Cleaning Instrument, hexagonal |
| or | |
| ● 324.253 | Cleaning Instrument, Stardrive, T25 |
-

The cleaning instrument helps to clean the recess of the screw heads. After placing the drill sleeve, insert the cleaning instrument carefully. Insert the stiletto with threaded tip and turn clockwise. Remove the cleaning instrument. Unlock all screws manually with the torque-limiting screwdriver. In a second step, completely remove all screws with a power tool.

If the screws cannot be removed with the screwdriver, refer to the surgical technique “Screw Extraction Set”.

After removing all screws, remove the plate. Should the plate remain stuck when all screws have been removed, take the insertion guide away and use the fixation bolt to loosen the plate.

■ Notes:

- Never use the cleaning instrument as a screwdriver.
- Use the additionally available cleaning instrument, as necessary, to remove tissue from the hexagonal socket of the screwhead to facilitate removal.

Additional Information

If it is difficult to perform a correct reduction, improve the access by increasing the soft-tissue opening.

▲ Precaution:

Bending and twisting the plate is not recommended as it may result in a misalignment between the holes of the insertion guide and the corresponding plate holes.

Should the plate lie too ventral or too dorsal, the screws cannot be centered in the medullary canal. This position may compromise screw purchase (see illustration).

Both screwdriver shaft and torque-limiting screwdriver are equipped with a self-holding mechanism. Apply slight pressure on pick-up to ensure that the screwdriver shaft penetrates the recess of the screw head.

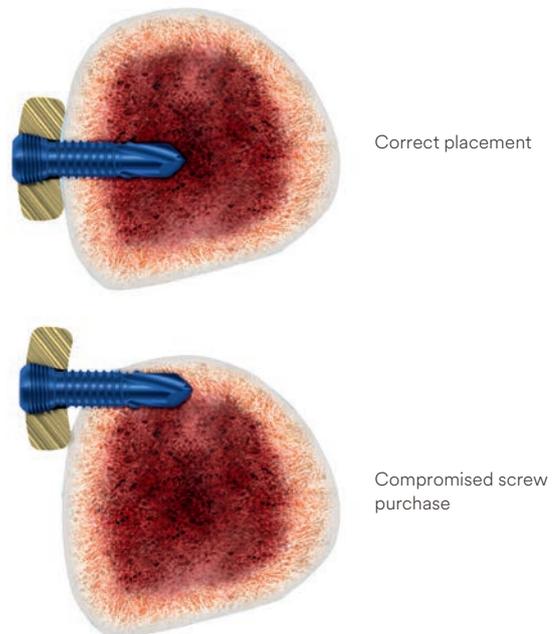
Should the screwdriver be difficult to remove after insertion, disconnect it from the power tool and remove the drill sleeve. After reconnecting the screwdriver to the power tool, withdraw the screwdriver from the screw.

Standard 4.5mm cortex screws can be used through the insertion guide if required. Note that cortex screws cannot be inserted through the drill sleeve for LISS insertion guide.

Hole A serves to lock the insertion guide to the implant. This hole cannot be used for the insertion of a screw as long as the fixation bolt is attached. If a screw has to be inserted in hole A, remove the fixation bolt – with the stabilization bolt still in place – and attach it in an adjacent hole. Place the drill sleeve in hole A (pre-drill if necessary) and insert the appropriate screw. If all holes are occupied by a screw, the screw in hole A can be inserted by free-hand technique. Use the direction given by the fixation bolt prior to removal of the insertion guide to determine the correct direction for insertion.

To ensure stability of the construct, the most distal screw should be inserted last, just before removing the insertion guide. Remove the stabilization bolt and insert the screw through the drill sleeve.

If hole A is unoccupied, it must be closed with a Screw Hole Insert (422.390) to facilitate the application of the insertion guide for removing the implant.



Instruments for Minimally Invasive Osteosynthesis

Hohmann Retractor Holder

The Hohmann retractor holder enables the percutaneous insertion of plates. It can be used in combination with implant systems such as LCP and LISS.

For additional information see the separate DePuy Synthes publication on the Hohmann retractor holder.



Soft Tissue Retractor

The offset blade facilitates the preparation of the epipereosteal cavity for percutaneous plate insertion.

- Adjustable blade for insertion angle and blade length
- Available in two sizes: for small and large fragment plates

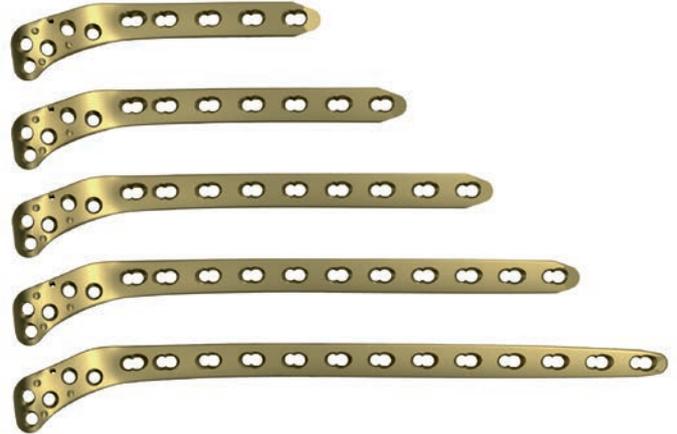
For additional information see the separate DePuy Synthes publication on the Soft tissue retractor.



Implants

LCP PLT 4.5/5.0

Stainless steel Alloy (TAN)	Titanium	Holes	Length (mm)	
222.220	422.220	5	140	right
222.222	422.222	7	180	right
222.224	422.224	9	220	right
222.226	422.226	11	260	right
222.228	422.228	13	300	right
222.221	422.221	5	140	left
222.223	422.223	7	180	left
222.225	422.225	9	220	left
222.227	422.227	11	260	left
222.229	422.229	13	300	left



All plates are available nonsterile and sterile packed.
For sterile implants add suffix S to the article number.

Locking Screws \varnothing 5.0 mm

 Hex	 Stardrive	
X13.414 – X13.490	X12.251 – X12.267	self-drilling, length 14–90 mm
X13.314 – X13.390	X12.201 – X12.227	self-tapping, length 14–90 mm
OX.221.458 OX.221.460 OX.221.462 X22.402 X22.404	OX.221.508 OX.221.510 OX.221.512 OX.221.514 OX.221.518	for periprosthetic fractures, self-tapping, length 8–18 mm



X=2: stainless steel

X=4: TAN

Cortex Screw \varnothing 4.5 mm, self-tapping

May be used in the DCU portion of the combi-holes of the LCP PLT Plate. Used to compress the plate to the bone or create axial compression

- Hexagonal recess

Stainless steel	214.814 – 214.890	Length 14 mm – 90 mm
Titanium (TiCP)	414.814 – 414.890	Length 14 mm – 90 mm



422.390	Screw Hole Insert \varnothing 5.0 mm
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All screws are available nonsterile and sterile packed. For sterile implants add suffix S to the article number.

Instruments

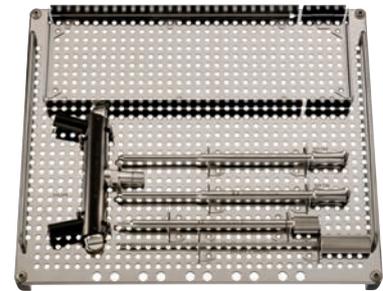
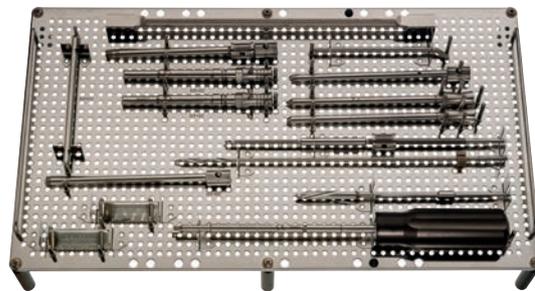
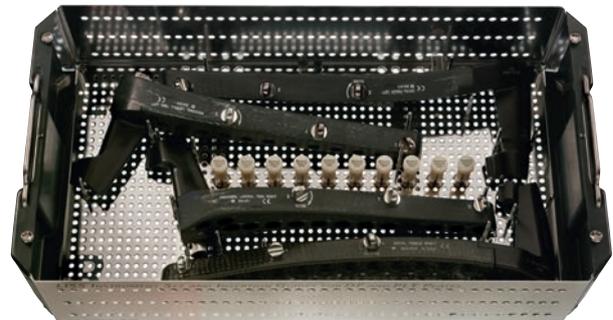
324.003	LISS Insertion Guide for Proximal Tibia, left, radiolucent	
324.004	LISS Insertion Guide for Proximal Tibia, right, radiolucent	
324.043	Fixation Bolt for LISS Insertion Guide, length 151mm	
321.170	Pin Wrench Ø 4.5 mm, length 120 mm	
324.022	Drill Sleeve for LISS Insertion Guide, length 130mm	
324.044	Stabilization Bolt for LISS Insertion Guide, length 156 mm	
324.027	Trocar, length 162 mm, for No. 324.022	
324.033	Pulling Device Ø 4.0 mm, length 240 mm, for LISS	
310.423	Drill Bit Ø 4.3 mm, length 280 mm, for LISS	
● 324.052	Torque-limiting Screwdriver 3.5, self-holding, for Locking Screws Ø 5.0 mm	
● 314.163	Torque-limiting Screwdriver Stardrive, T25, self-holding, for Locking Screws Ø 5.0 mm	
● 324.050	Screwdriver Shaft 3.5, hexagonal, length 158mm	
● 324.250	Screwdriver Shaft Stardrive, T25, length 158mm	

324.055	Centering Sleeve for Kirschner Wire, length 161 mm, for No. 324.022	
324.019	Stopper for LISS Insertion Guide	
324.056	X-ray Calibrator, length 50 mm	
● 324.053	Cleaning Instrument for Screw Head, length 202 mm	
● 324.253	Cleaning Instrument for Screw Head Stardrive, T25, length 202 mm	
292.699	Kirschner Wire Ø 2.0 mm with threaded tip, length 280 mm, Stainless Steel	
324.037	LISS Measuring Device for Kirschner Wires Ø 2.0 mm, length 121mm, for No. 292.699	
324.007	Drill Sleeve 7.2/4.3, length 130 mm, for LISS Periprosthetic Screws	
Optional Instruments		
324.048	Aiming Device for Kirschner Wires, for LISS Insertion Guide	
324.034	Centering Sleeve for Kirschner Wire, length 184 mm, for No. 324.048	
312.940	Guiding Block for LCP-PLT 4.5/5.0, right	
312.941	Guiding Block for LCP-PLT 4.5/5.0, left	
323.042	LCP Drill Sleeve 5.0, for Drill Bits Ø 4.3 mm	
310.430	LCP Drill Bit Ø 4.3 mm with Stop, length 221mm, 2-flute, for Quick Coupling	

Sets

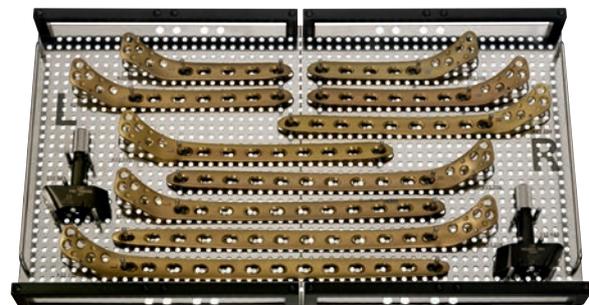
LISS Instruments and Insertion Handle, for DF and PLT Plates in Vario Case

01.120.040	Hex
01.120.041	Stardrive
68.120.040	Vario Case



LCP PLT 4.5/5.0 in Vario Case

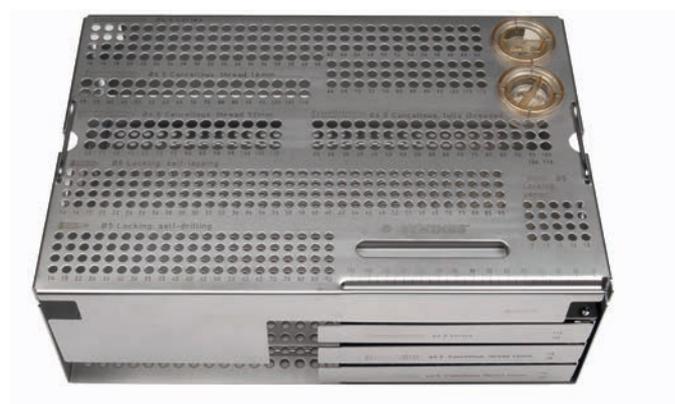
01.120.412	Stainless steel
01.120.414	TAN
68.120.410	Insert



Locking Screws \varnothing 5.0mm and Standard Screws \varnothing 4.5/6.5 mm in Sterilizing Tray

 Hex
  Stardrive

Stainless steel	01.200.011	01.200.013
Titanium	01.200.012	01.200.014
300.610	Sterilizing Tray	



Discontinued Implant

LISS PLT 5.0

Titanium Alloy (TAN)	Holes	Length (mm)	
422.300	5	140	right
422.304	9	220	right
422.308	13	300	right
422.301	5	140	left
422.305	9	220	left
422.309	13	300	left



All screws are available nonsterile and sterile packed.
For sterile implants add suffix S to the article number.

MRI Information

Torque, Displacement and Image Artifacts according to ASTM F 2213-06, ASTM F 2052-14 and ASTM F2119-07

Non-clinical testing of worst case scenario in a 3 T MRI system did not reveal any relevant torque or displacement of the construct for an experimentally measured local spatial gradient of the magnetic field of 3.69 T/m. The largest image artifact extended approximately 169 mm from the construct when scanned using the Gradient Echo (GE). Testing was conducted on a 3 T MRI system.

Radio-Frequency-(RF-)induced heating according to ASTM F2182-11a

Non-clinical electromagnetic and thermal testing of worst case scenario lead to peak temperature rise of 9.5 °C with an average temperature rise of 6.6 °C (1.5 T) and a peak temperature rise of 5.9 °C (3 T) under MRI Conditions using RF Coils (whole body averaged specific absorption rate [SAR] of 2 W/kg for 6 minutes [1.5 T] and for 15 minutes [3 T]).

▲ Precautions:

The above mentioned test relies on non-clinical testing. The actual temperature rise in the patient will depend on a variety of factors beyond the SAR and time of RF application. Thus, it is recommended to pay particular attention to the following points:

- It is recommended to thoroughly monitor patients undergoing MR scanning for perceived temperature and/or pain sensations.
- Patients with impaired thermoregulation or temperature sensation should be excluded from MR scanning procedures.
- Generally, it is recommended to use a MR system with low field strength in the presence of conductive implants. The employed specific absorption rate (SAR) should be reduced as far as possible.
- Using the ventilation system may further contribute to reduce temperature increase in the body.

Not all products are currently available in all markets.
This publication is not intended for distribution in the USA.
Intended use, Indications and Contraindications can be found in the corresponding system Instructions for Use.
All Surgical Techniques are available as PDF files at www.depuysynthes.com/ifu



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