

**SURGICAL
TECHNIQUE**



Locking Proximal Tibia Plate

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WARNING:

This description alone does not provide sufficient background for direct use of 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.

INDICATIONS

Monoloc Locking Proximal Tibial Plate System is indicated for the fixation of proximal tibia fractures including, but not limited to:

- 1.1 Extra-articular fracture, partial articular fracture, and complete articular fracture of proximal end segment of tibia.
- 1.2 Simple, comminuted proximal fractures with associated shaft fractures, nonunion, malunion and osteotomies in proximal tibia.

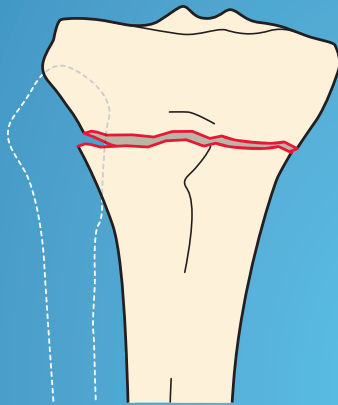


figure 1.1a: extra-articular fracture

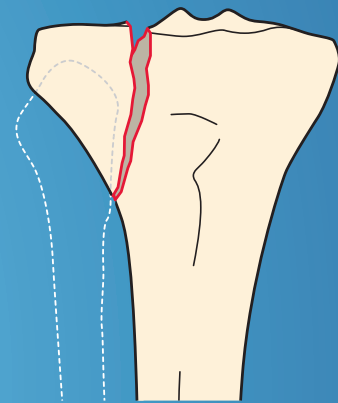


figure 1.1b: partial articular fracture

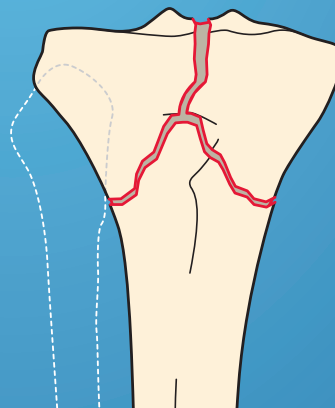


figure 1.1c: complete articular fracture

PLATE DESIGN

- The shape of the plate is suitable to the anatomical shape of the bone.
- Proximal end of the bone plate is designed to fit properly to the bone surface.
- K-wires holes at the proximal end are parallel to the joint and can be used for temporary fixation of the fracture fragments.
- Elongated, non-threaded holes accept cortex screws. Cortex screws provide dynamic compression, adjust plate position for temporary fixation.
- The tapered end of the plate facilitates percutaneous placement and prevents soft tissue irritation.

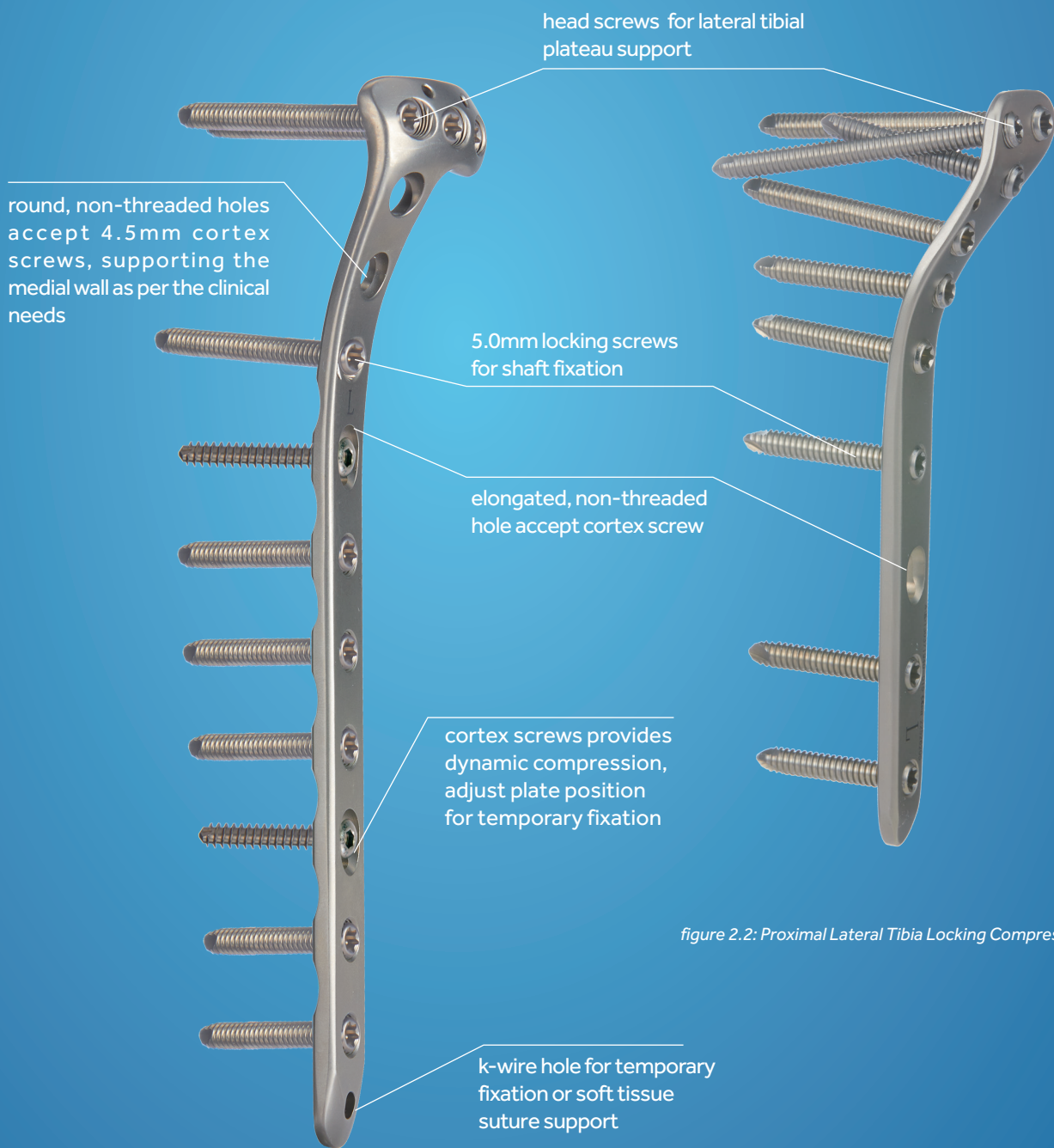


figure 2.2: Proximal Lateral Tibia Locking Compression Plate

figure 2.1: Locking Proximal Tibia Compression Plate

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3.1 Pre-operative planning

Complete pre-operative radiography (AP and ML +/- traction) of the proximal tibia is necessary. CT Scan with 3D reconstruction may aid further understanding of complex fractures.

Pre-operative evaluation:

1. Length of plate
2. Intra-articular reduction and inter-fragmentary screw fixation
3. Placement and number of head screws
4. Placement and number of shaft screws

3.2 Patient Positioning

- The patient is positioned supine on a radiolucent operating table.
- Visualization of the proximal tibia in both the ML and AP projections should be ensured throughout the surgery.
- If necessary, place a bolster below the leg for better stabilization and neutral positioning.
- Apply a tourniquet if needed.

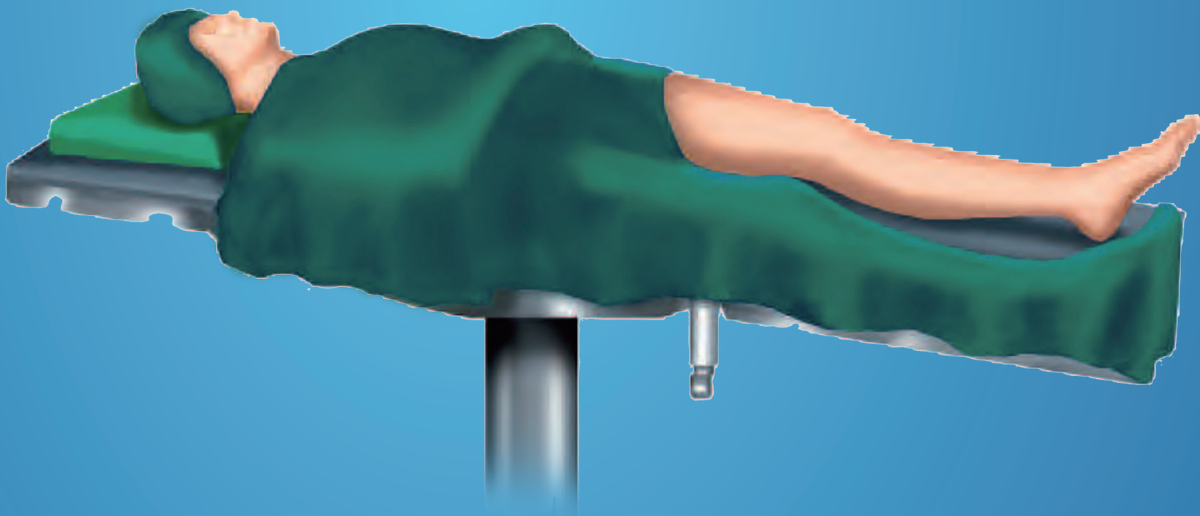


figure 3.2: patient positioning

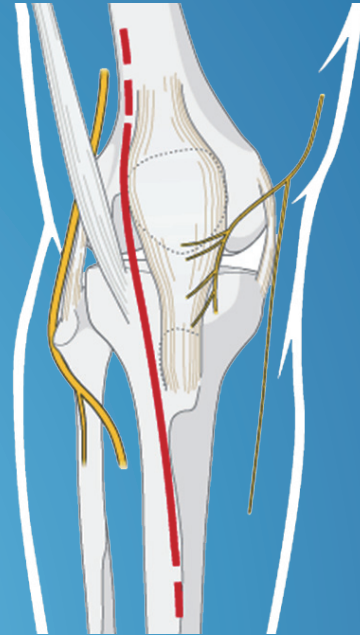
3.3 Surgical Approach

Exposure

- Preserve soft tissue attachments to any comminuted fragments when possible to maintain vascularity.
- Preserve or repair periosteum in order to maintain adequate vascularity.

Incision

- A straight or slightly curved incision is approached from the lateral epicondyle to the tibial tuberosity. According to the fracture position, the incision can be extended proximally and/or distally for more exposure.
- The dissection should go straight down to the bone by detaching the anterior compartment muscle origins and splitting the fibers of the iliotibial tract. The knee joint is then opened below the lateral meniscus in order to get a good view of the articular surface.



3.4 Fracture Reduction

- The fracture of the proximal tibia may be reduced and maintained with temporary **K-wire** and **Reduction Forceps** under the image intensification.
- Ensure that K-wires will not interfere with subsequent plate placement.

3.5 Bend Plate

- Due to varying patient anatomy, slight plate bending may be necessary. Contour the plate as needed using the **Bending Irons**.
- **Note:** Do not bend the plate more than 10 degree as this will cause the deformation of the locking holes. If necessary, insert the **Spacer (31454007)** before bending.

Instruments:



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3.6 Plate Positioning

Position the plate on the reduced bone, and attach it temporarily with the plate holding forceps, push/pull reduction device or a 4.5 mm cortex screw in an elongated hole. Use A/P and ML fluoroscopic images to ensure the plate is positioned appropriately on the bone metaphysis. After plate insertion, check alignment of the bone using fluoroscopy.

Note: This plate is pre-contoured to fit the tibia. If the plate contour is changed, it is important to check the position of the screws in relation to the joint, using screw placement verification.

3.7 Temporary fixation of the plate

Fix the plate temporarily with a cortex screw in the elongated hole.

- Drill with **Drill Bit 3.2 (010020)** using **Double Drill Guide 4.5/3.2 (206120)**.
- Use the correspondent **Depth Gauge (206170)** to determine the cortex screw length

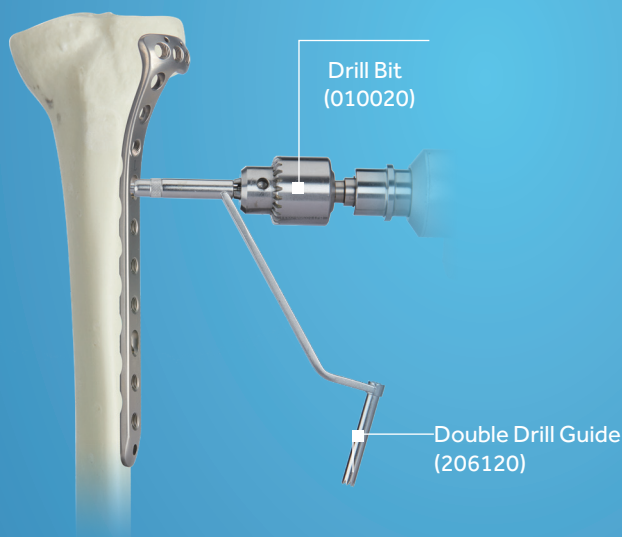


Figure 3.7a: Drill Bit & Double Drill Guide

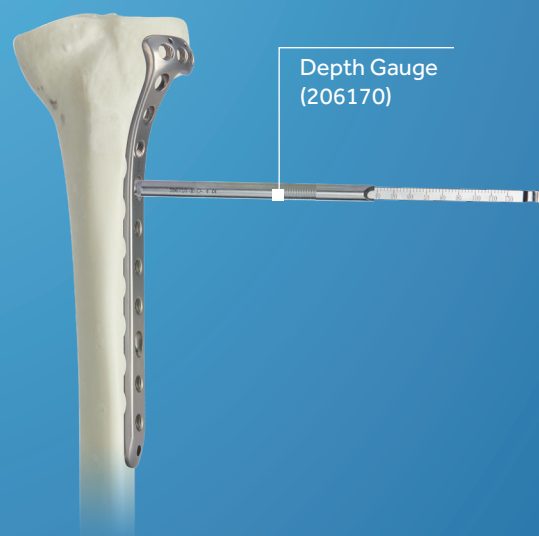


Figure 3.7b: Depth Gauge

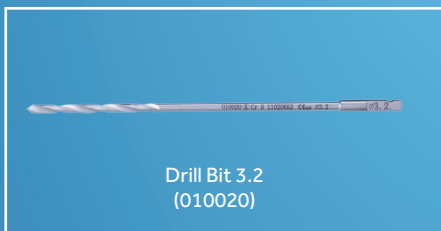
SURGICAL TECHNIQUE

- c. Insert the 4.5mm cortex screw by using the **Screw Holding Sleeve for Hex Screw (206300)** and **Hex Screwdriver (206280)**. In order to be able to adjust the position of the plate, do not tighten the screw completely.
- d. When the plate position has been confirmed, tighten the cortex screw, using the Hex Screwdriver.



Figure 3.7c: Insert Cortex Screw

Instruments for 4.5mm cortex screw:



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3.8 Insert Head Screws

- Insert the **Drill Guide 4.1 (226100)** into the hole until fully seated.
- Drill with **Drill Bit with stop, 4.1mm (226110)** to desired depth.
- Remove the drill guide and use the **Depth Gauge, 90mm (206170)** for measurement.
- Choose the appropriate screw with a desired length and use the **Screw Holding Sleeve for StarDrive Screw (226140)** together with **Torx Screwdriver, with Quick Coupling (226200)** and the **T-handle with Quick Coupling (030100)** or power tool to insert the screw until the screw head is close to the hole.

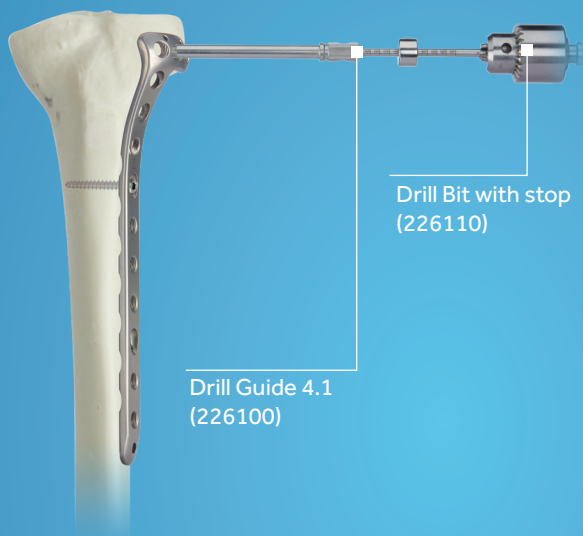


Figure 3.8a,b: Drill Guide & Drill Bit with stop



Figure 3.8c: Depth Gauge



Figure 3.8d: Insert 5.0 Locking Screw

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3.9 Insert Shaft Screws

- Insert the **Drill Guide 4.1 (226100)** into the hole until fully seated.
- Drill with **Drill Bit with stop, 4.1mm (226110)** to desired depth. Normally, the distal screw hole in the shaft is suggested to be firstly drilled to ensure the plate position is appropriate.
- Remove the drill guide and use the **Depth Gauge, 90mm (206170)** for measurement.
- Choose the appropriate screw with a desired length and use the **Screw Holding Sleeve for StarDrive Screw (226140)** together with **Torx Screwdriver, with Quick Coupling (226200)** and the **T-handle with Quick Coupling (030100)** or power tool to insert the screw until the screw head is close to the hole.

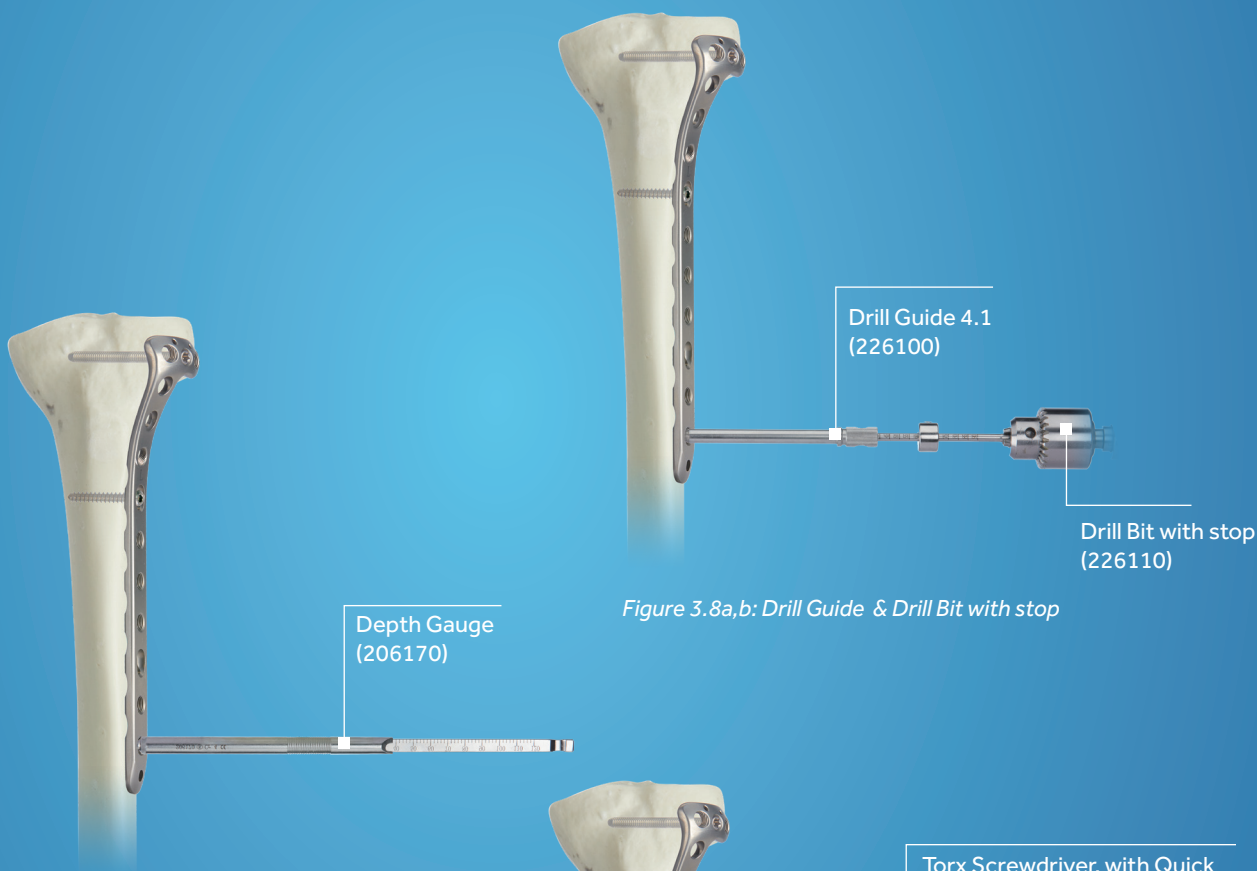


Figure 3.8a,b: Drill Guide & Drill Bit with stop

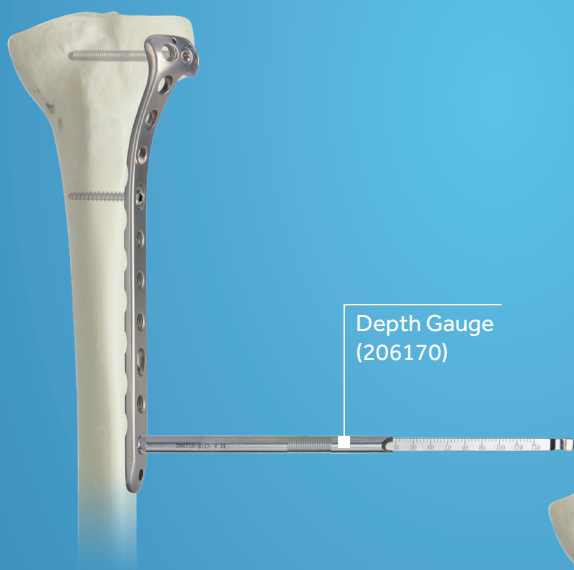


Figure 3.8c: Depth Gauge

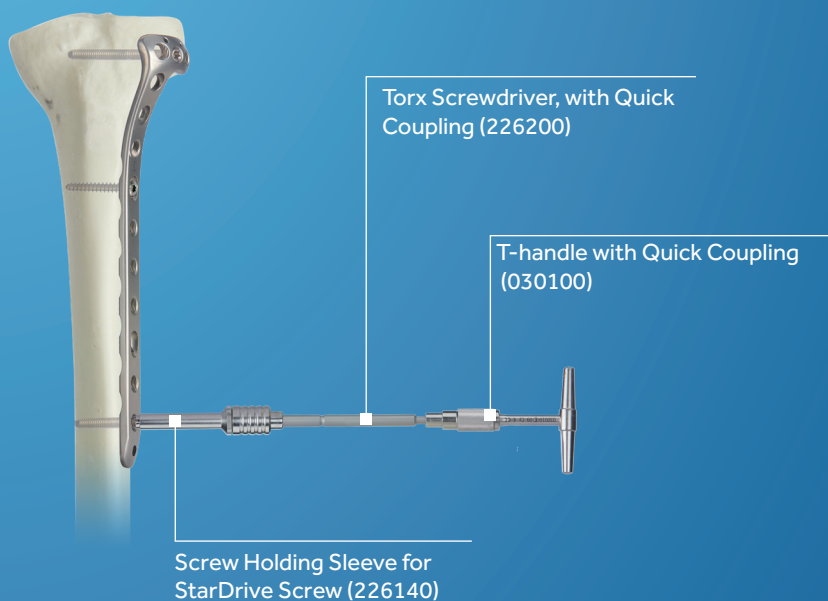
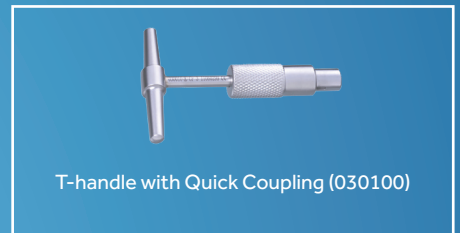
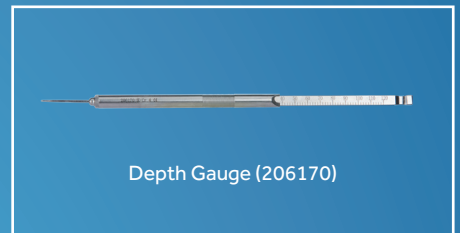
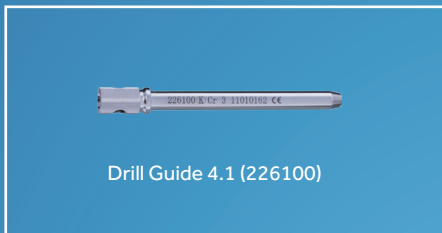


Figure 3.8d: Insert 5.0 Locking Screw

SURGICAL TECHNIQUE

Instruments for 5.0mm Locking Screw



- Repeat the above steps for all required screw fixation.
- Finally tighten all the locking screws:
 - Use **Torque-limiting Screwdriver, T25 (226151)** to tighten the 5.0mm locking screws.

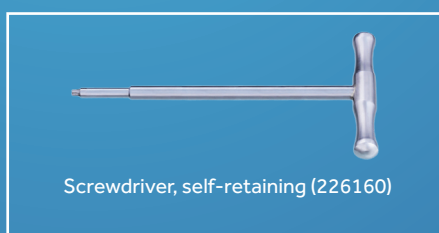
Instruments:



IMPLANT REMOVAL

- To remove locking screws, unlock all screws from the plate and then begin to remove the screws completely. This avoids rotation of the plate when removing the last locking screw.
- Use **Hex Screwdriver (206280)** to remove the 4.5mm cortex screw
- Use **Screwdriver, self-retaining (226160)**, to remove the 5.0mm locking screws

Instruments:



IMPLANTS AND INSTRUMENTS

Locking Proximal Tibial Plate 4.5/5.0



Specification	
Thickness (mm)	3.8
Width (mm)	14
Material	PT

Code	Model No.	Size	Direction	Length (mm)
22591204	SDDG14	3+4H	Left	83.2
22591205	SDDG14	3+5H	Left	99.2
22591206	SDDG14	3+6H	Left	115.2
22591207	SDDG14	3+7H	Left	131.2
22591208	SDDG14	3+8H	Left	147.2
22591209	SDDG14	3+9H	Left	163.2
22591210	SDDG14	3+10H	Left	179.2
22591104	SDDG13	3+4H	Right	83.2
22591105	SDDG13	3+5H	Right	99.2
22591106	SDDG13	3+6H	Right	115.2
22591107	SDDG13	3+7H	Right	131.2
22591108	SDDG13	3+8H	Right	147.2
22591109	SDDG13	3+9H	Right	163.2
22591110	SDDG13	3+10H	Right	179.2

Proximal Lateral Tibia Locking Compression Plates 4.5/5.0



Specification	
Thickness (mm)	4.2
Width (mm)	16
Material	PT

Code	Model No.	Size	Direction	Length (mm)
22526205	SDDG49	5H	Left	140
22526207	SDDG49	7H	Left	180
22526209	SDDG49	9H	Left	220
22526211	SDDG49	11H	Left	260
22526213	SDDG49	13H	Left	300
22526105	SDDG48	5H	Right	140
22526107	SDDG48	7H	Right	180
22526109	SDDG48	9H	Right	220
22526111	SDDG48	11H	Right	260
22526113	SDDG48	13H	Right	300

Cortex Screws, fully threaded



Specification	
Core (mm)	3
Material	TA

Code	Model No.	Size
30308116	HAQ03	4.5×16mm
30308118	HAQ03	4.5×18mm
30308120	HAQ03	4.5×20mm
30308122	HAQ03	4.5×22mm
30308124	HAQ03	4.5×24mm
30308126	HAQ03	4.5×26mm
30308128	HAQ03	4.5×28mm
30308130	HAQ03	4.5×30mm
30308132	HAQ03	4.5×32mm
30308134	HAQ03	4.5×34mm
30308136	HAQ03	4.5×36mm
30308138	HAQ03	4.5×38mm
30308140	HAQ03	4.5×40mm
30308142	HAQ03	4.5×42mm
30308144	HAQ03	4.5×44mm
30308146	HAQ03	4.5×46mm
30308148	HAQ03	4.5×48mm
30308150	HAQ03	4.5×50mm
30308152	HAQ03	4.5×52mm
30308154	HAQ03	4.5×54mm
30308156	HAQ03	4.5×56mm
30308158	HAQ03	4.5×58mm
30308160	HAQ03	4.5×60mm

Cortex Screws, partially threaded



Specification	
Core (mm)	3
Shaft (mm)	3
Material	TA

Code	Model No.	Size
30308220	HAQ03	4.5×20mm
30308222	HAQ03	4.5×22mm
30308224	HAQ03	4.5×24mm
30308226	HAQ03	4.5×26mm
30308228	HAQ03	4.5×28mm
30308230	HAQ03	4.5×30mm
30308232	HAQ03	4.5×32mm
30308234	HAQ03	4.5×34mm
30308236	HAQ03	4.5×36mm
30308238	HAQ03	4.5×38mm
30308240	HAQ03	4.5×40mm
30308242	HAQ03	4.5×42mm
30308244	HAQ03	4.5×44mm
30308246	HAQ03	4.5×46mm
30308248	HAQ03	4.5×48mm
30308250	HAQ03	4.5×50mm
30308252	HAQ03	4.5×52mm
30308254	HAQ03	4.5×54mm
30308256	HAQ03	4.5×56mm
30308258	HAQ03	4.5×58mm
30308260	HAQ03	4.5×60mm

IMPLANTS AND INSTRUMENTS

Screws

Locking Head Screws, 5.0mm, self-tapping, self-drilling



Specification	
Core (mm)	4.2
Material	TA

Code	Model No.	Size
32582014	SDLD02	5.0×14mm
32582016	SDLD02	5.0×16mm
32582018	SDLD02	5.0×18mm
32582020	SDLD02	5.0×20mm
32582022	SDLD02	5.0×22mm
32582024	SDLD02	5.0×24mm
32582026	SDLD02	5.0×26mm
32582028	SDLD02	5.0×28mm
32582030	SDLD02	5.0×30mm
32582032	SDLD02	5.0×32mm
32582034	SDLD02	5.0×34mm
32582036	SDLD02	5.0×36mm
32582038	SDLD02	5.0×38mm
32582040	SDLD02	5.0×40mm
32582042	SDLD02	5.0×42mm
32582044	SDLD02	5.0×44mm
32582046	SDLD02	5.0×46mm
32582048	SDLD02	5.0×48mm
32582050	SDLD02	5.0×50mm
32582055	SDLD02	5.0×55mm
32582060	SDLD02	5.0×60mm
32582065	SDLD02	5.0×65mm
32582070	SDLD02	5.0×70mm
32582075	SDLD02	5.0×75mm
32582080	SDLD02	5.0×80mm
32582085	SDLD02	5.0×85mm

Note: If self-drilling screws are used, do not exceed the contra-lateral cortex.

Spacer, 2mm Length



Specification	
Material	TA

Code	Model No.	Size
31454007	SDLD04	5.0mm

Locking Head Screws, 5.0mm, self-tapping



Specification	
Core (mm)	4.2
Material	TA

Code	Model No.	Size
31452014	SDLD01	5.0×14mm
31452016	SDLD01	5.0×16mm
31452018	SDLD01	5.0×18mm
31452020	SDLD01	5.0×20mm
31452022	SDLD01	5.0×22mm
31452024	SDLD01	5.0×24mm
31452026	SDLD01	5.0×26mm
31452028	SDLD01	5.0×28mm
31452030	SDLD01	5.0×30mm
31452032	SDLD01	5.0×32mm
31452034	SDLD01	5.0×34mm
31452036	SDLD01	5.0×36mm
31452038	SDLD01	5.0×38mm
31452040	SDLD01	5.0×40mm
31452042	SDLD01	5.0×42mm
31452044	SDLD01	5.0×44mm
31452046	SDLD01	5.0×46mm
31452048	SDLD01	5.0×48mm
31452050	SDLD01	5.0×50mm
31452055	SDLD01	5.0×55mm
31452060	SDLD01	5.0×60mm
31452065	SDLD01	5.0×65mm
31452070	SDLD01	5.0×70mm
31452075	SDLD01	5.0×75mm
31452080	SDLD01	5.0×80mm
31452085	SDLD01	5.0×85mm
31452090	SDLD01	5.0×90mm

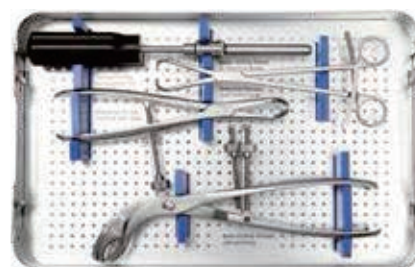
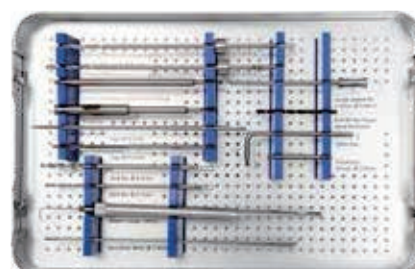
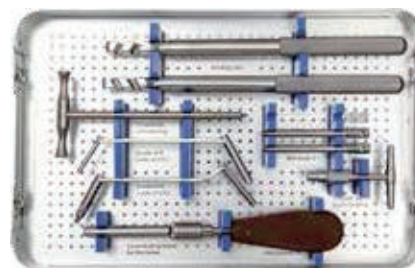
IMPLANTS AND INSTRUMENTS

MonoLoc Locking Plates System

Limbs

Monoloc 5.0mm Instruments Set

Code	Product Description	Qty.
227900	MonoLoc 5.0mm Locking Plate System Instruments Set	
898146	5.0mm Screw Case -PPSU	1
898348	MonoLoc 5.0mm Locking Plate System Instruments Set (Empty)-PPSU	1
226100	Drill Guide 4.1	3
226110	Drill Bit with Stop, ϕ 4.1mm	1
227110	Drill Bit with straight shank, ϕ 4.1mm	2
226120	Guide Sleeve for K-Wire, ϕ 2.0mm	1
226151	Torque-limiting Screwdriver, T25	1
226140	Screw Holding Sleeve for StarDrive Screw	1
226160	Screwdriver, self-retaining	1
226200	Torx Screwdriver, with Quick Coupling	1
226170	Extraction Screw, ϕ 5.0mm	1
221180	Allen Key	1
226190	Drill Bit for Screw Head Removal	1
10737230	Kirschner Wire, ϕ 2.0mm	3
206110	Double Drill Guide 6.5/3.2	1
206120	Double Drill Guide 4.5/3.2	1
206240	Trepine	1
010040	Drill Bit, ϕ 4.5mm	1
010020	Drill Bit, ϕ 3.2mm	1
206170	Depth Gauge, 90mm	1
030100	T-handle with Quick Coupling	1
020040	Tap, ϕ 6.5mm	1
020030	Tap, ϕ 4.5mm	1
206280	Hex Screwdriver	1
206300	Screw Holding Sleeve for Hex Screw	1
206150	Reduction Forceps, serrated jaws, large	1
206160	Reduction Forceps with Points, large	1
206290	Bone Holding Forceps, self-centering	2
206320	Bending Irons, left	1
206340	Bending Irons, right	1



Optional Instrument

Code	Product Description	Qty.
898144	Hex Screwdriver (silicon handle)	1
206330	Plates Bender	1

Implant Case

Code	Product Description
898369	5.0 LCP Implant Case (2 cases)

MonoLoc Locking Plates System

Limbs

Monoloc 5.0mm Instrument

 <p>226100 Drill Guide 4.1</p>	 <p>226110 Drill Bit with Stop, φ4.1mm</p>	 <p>226120 Guide Sleeve for K-Wire, φ2.0mm</p>
 <p>226151 Torque-limiting Screwdriver, T25</p>	 <p>226140 Screw Holding Sleeve for StarDrive Screw</p>	 <p>226160 Screwdriver, self-retaining</p>
 <p>226200 Torx Screwdriver, with Quick Coupling</p>	 <p>226170 Extraction Screw, φ5.0mm</p>	 <p>221180 Allen Key</p>
 <p>226190 Drill Bit for Screw Head Removal</p>	 <p>10737230 Kirschner Wire, φ2.0mm</p>	 <p>206110 Double Drill Guide 6.5/3.2</p>

IMPLANTS AND INSTRUMENTS

MonoLoc Locking Plates System

Limbs

Monoloc 5.0mm Instrument



206290
Bone Holding Forceps,
self-centering



206320
Bending Irons, left



206340
Bending Irons, right



206330
Plates Bender