Distal Femoral Locking Compression Plate

Medtronic
Further, Together

Table of Content

Monoloc Distal Femoral Locking Compression Plates System is indicated for fixation of distal femur fractures including, but not limited to:

1.1 Extra-articular fracture, partial articular fracture, and complete articular fracture of distal end segment of femur.

1.2 Simple, comminuted fractures with associated shaft fractures, nonunion, malunion and osteotomies in distal femur.
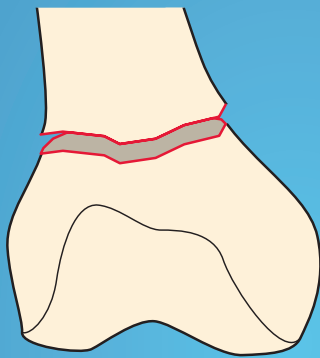
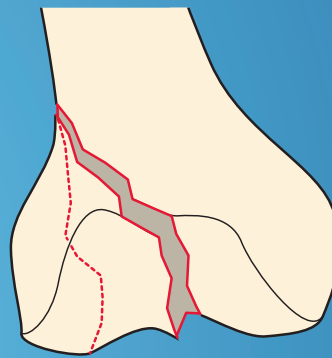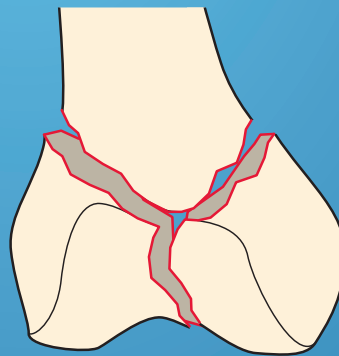*figure 1.1a: extra-articular fracture*   *figure 1.1b: partial articular fracture*

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 plate is designed to fit properly to the bone surface.
- K-wires holes at the distal end are parallel to the joint for temporary fixation of the fracture fragments.
- Elongated, non-threaded holes accept cortex screws. 4.5mm cortex screw provides dynamic compression, adjust the plate position for temporary fixation.
- The tapered end of the bone plate facilitates percutaneous placement and prevents soft tissue irritation.

4.5mm cortex screw provides dynamic compression, adjust the plate position for temporary fixation

elongated, non-threaded hole accept cortex screws

round holes accept locking screws

5.0mm locking screws for shaft fixation

A, B, C for medial support

D, E, F for medial condyle fixation

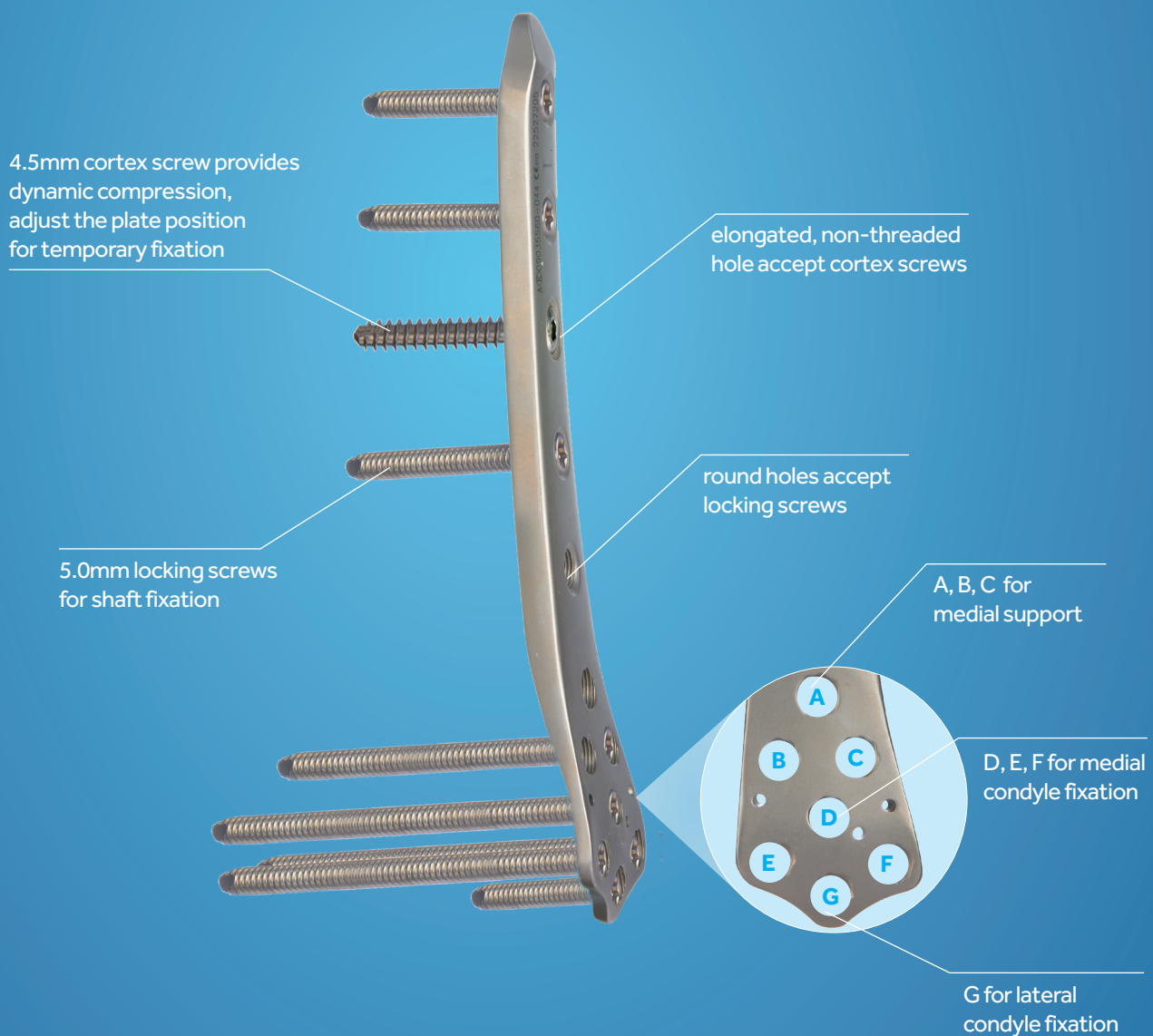G for lateral condyle fixation

A
B
C
D
E
F
G

figure 2.1: Distal Femoral Locking Compression Plate

SURGICAL TECHNIQUE

3.1 Pre-operative planning and patient positioning

Complete pre-operative radiography (AP and ML +/- traction) of the distal femur 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

Radiolucent table will be necessary to aid reduction and intra-operative radiographic evaluation.

figure 3.1: patient positioning
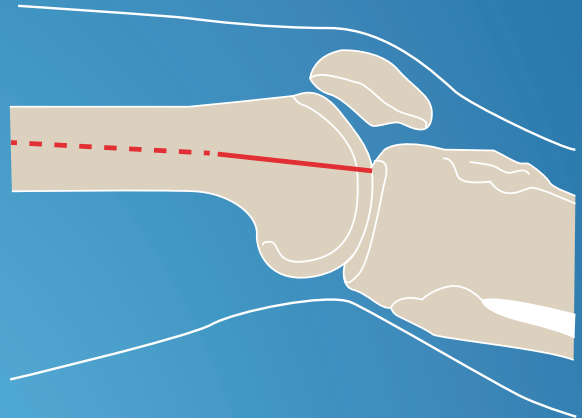
3.2 Surgical approach

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 lateral incision is recommended. The surgical incision can be extended to the distal direction to expose the fracture zone.
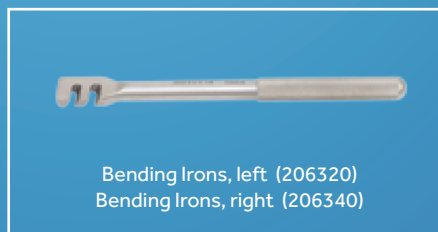

3.3 Fracture Reduction

- The fracture of the distal femur 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.

3.4 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:

K-wire (10737230)	Reduction Forceps, serrated jaws, large (206150)	Reduction Forceps with Points, large (206160)
Bone Holding Forceps, self-centering (206290)	Bending Irons, left (206320) Bending Irons, right (206340)	Spacer (31454007)
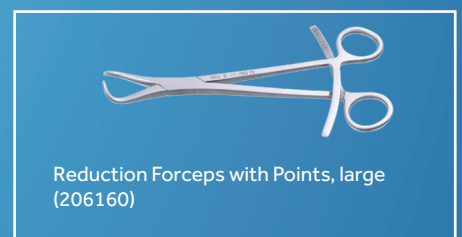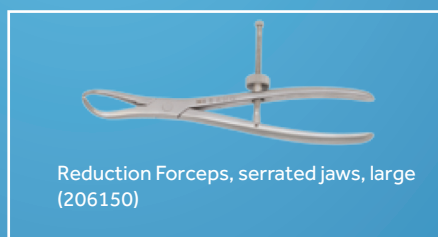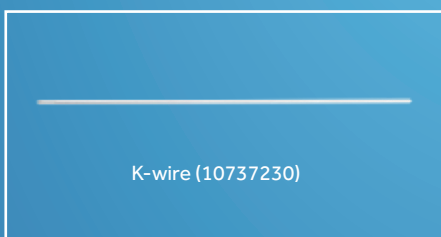
SURGICAL TECHNIQUE

3.5 Plate Positioning

- The distance between the head of the plate to the articular is 1-1.5cm. Place the plate as close as possible to the mid-line of femur.
- Attach it temporarily with the plate holding forceps, push/pull reduction device or an 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: The plate is pre-contoured to fit the femur. 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.

3.6 Temporary fixation of the plate

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

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

Drill Bit
(010020)

Double Drill Guide
(206120)
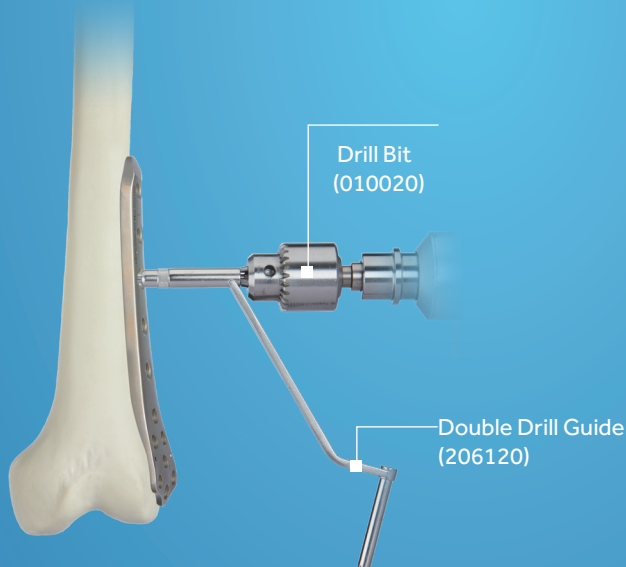
Figure 3.7a: Drill Bit & Double Drill Guide
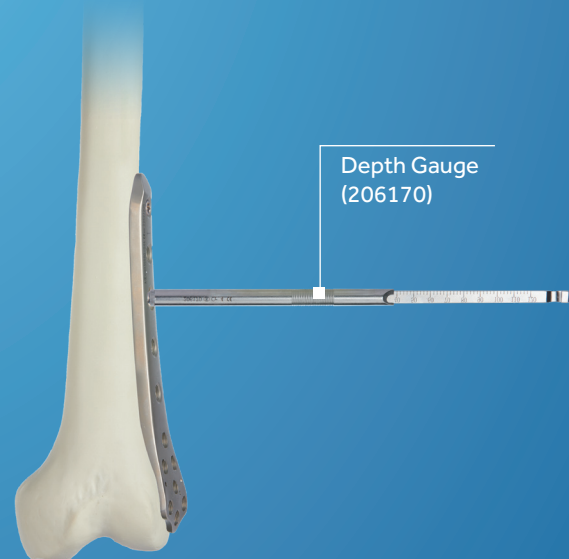
Depth Gauge
(206170)

Figure 3.7b: Depth Gauge

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.

Screw Holding Sleeve for Hex Screw (206300)

Hex Screwdriver (206280)
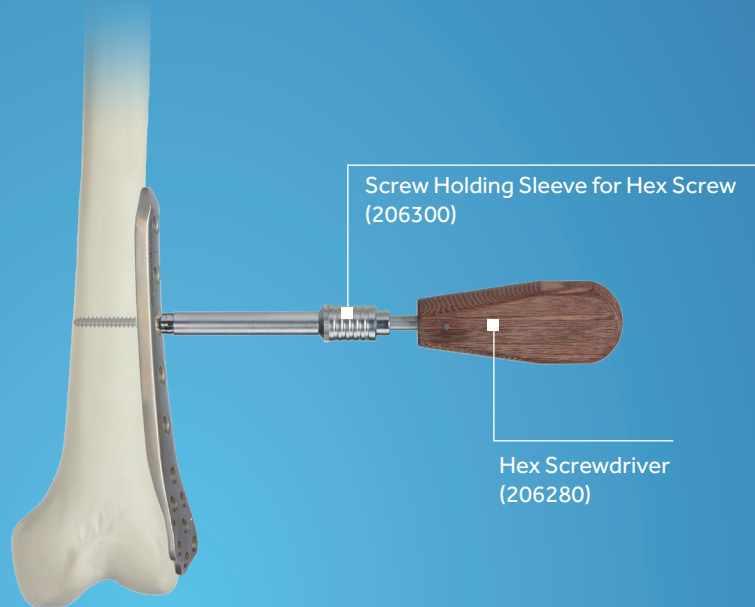
Figure 3.7c: Insert Cortex Screw

Instruments for 4.5mm cortex screw:

Drill Bit 3.2 (010020)

Double Drill Guide 4.5/3.2 (206120)

Depth Gauge 90mm (206170)

Screw Holding Sleeve for Hex Screw (206300)

Hex Screwdriver (206280)

3.7 Insert Head Screws

a. Insert the **Drill Guide 4.1 (226100)** into the round hole until fully seated.
b. Drill with **Drill Bit with stop, 4.1mm (226110)** to desired depth.
c. Remove the drill guide and use the **Depth Gauge, 90mm (206170)** for measurement.
d. 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.

Drill Bit with stop (226110)

Drill Guide 4.1 (226100)

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

Depth Gauge (206170)

Figure 3.8c: Depth Gauge

Screw Holding Sleeve for StarDrive Screw (226140)

Torx Screwdriver, with Quick Coupling (226200)

T-handle with Quick Coupling (030100)

Figure 3.8d: Insert 5.0 Locking Screw

3.8 Insert Shaft Screws

a. Insert the **Drill Guide 4.1 (226100)** into the hole until fully seated.

b. Drill with **Drill Bit with stop, 4.1mm (226110)** to desired depth. Normally, the proximal screw hole in the shaft is suggested to be firstly drilled to ensure the plate position is appropriate.

c. Remove the drill guide and use the **Depth Gauge, 90mm (206170)** for measurement.

d. 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.
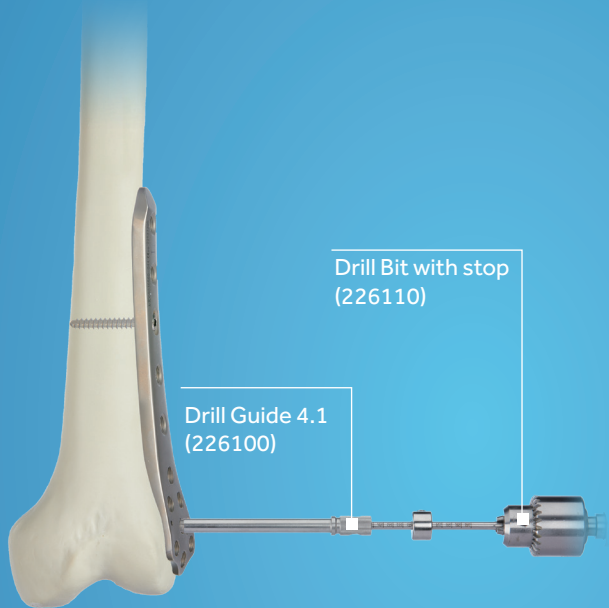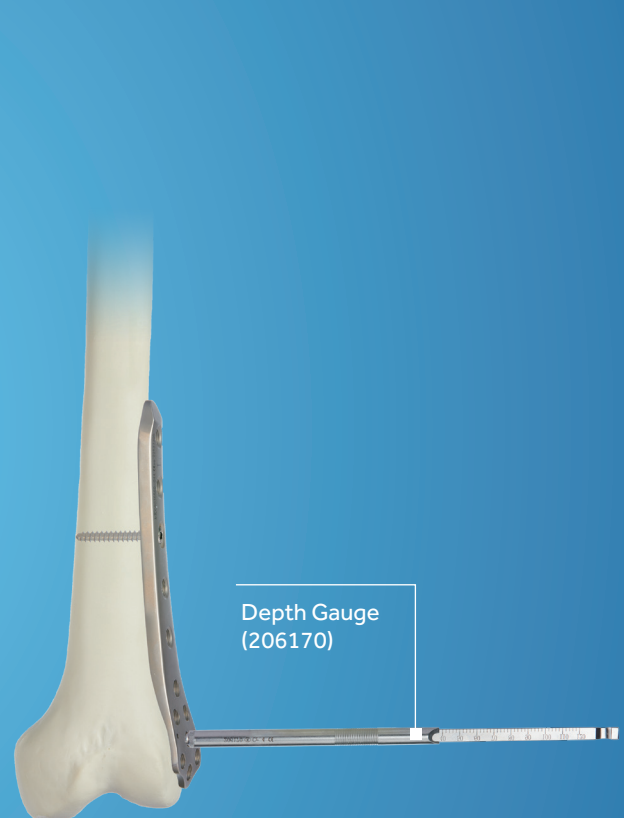

Drill Guide 4.1
(226100)

Drill Bit
(226110)

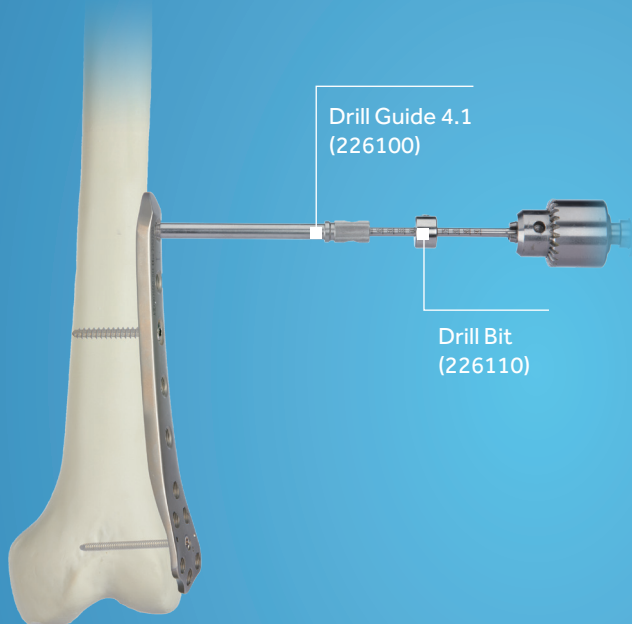*Figure 3.8a,b: Drill Guide & Drill Bit*

Depth Gauge
(206170)

Figure 3.8c: Depth Gauge

T-handle with Quick Coupling
(030100)

Torx Screwdriver, with Quick
Coupling (226200)

Screw Holding Sleeve for
StarDrive Screw (226140)
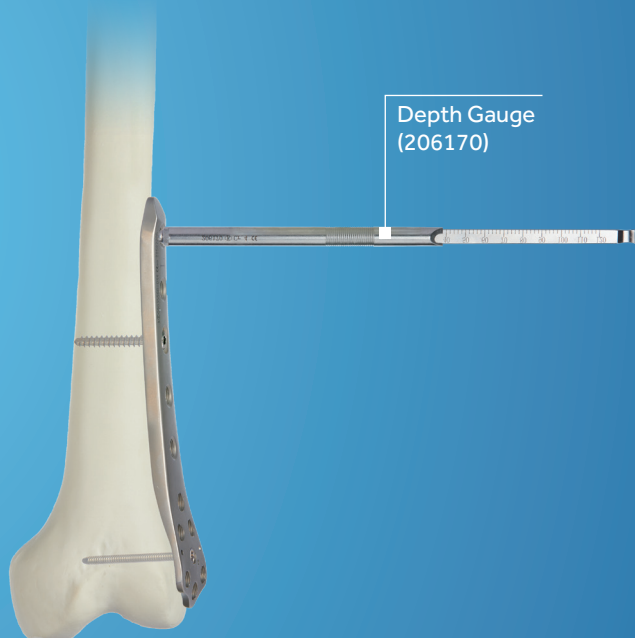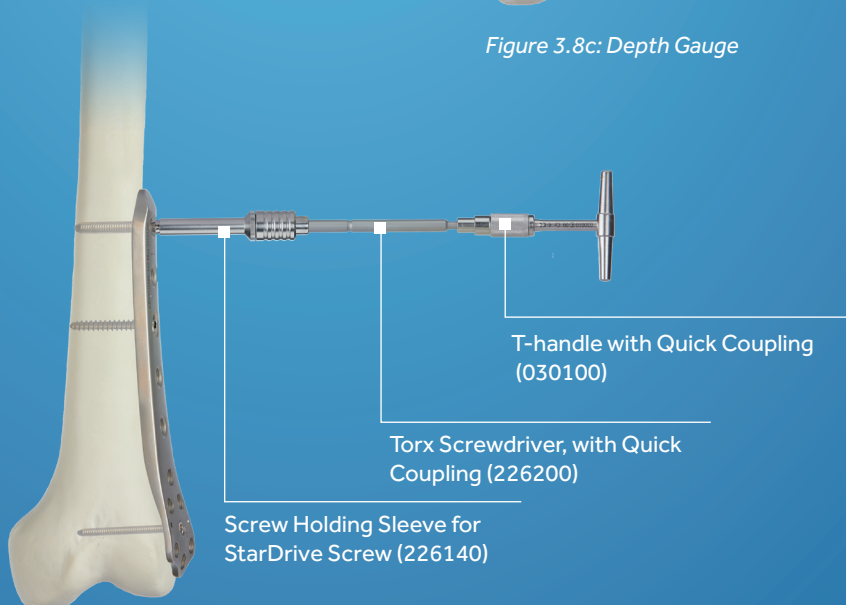
Figure 3.8d: Insert 5.0 Locking Screw

SURGICAL TECHNIQUE

Instruments for 5.0mm Locking Screw

Drill Guide 4.1 (226100)

Drill Bit with stop, 4.1mm (226110)

Depth Gauge (206170)

Screw Holding Sleeve for StarDrive Screw (226140)

Torx Screwdriver, with Quick Coupling (226200)

T-handle with Quick Coupling (030100)
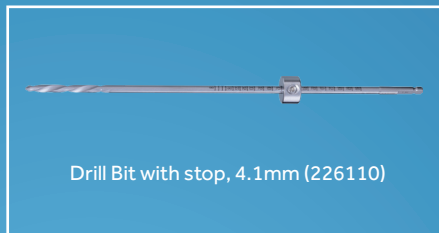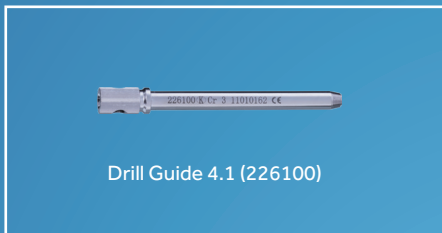
■ Repeat the above steps for all required screw fixation.

■ Finally tighten all the locking screws:
   Use **Torque-limiting Screwdriver, T25 (226151)** to tighten 5.0mm locking screws.

Instruments:

Torque-limiting Screwdriver, T25 (226151)

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:

Hex Screwdriver (206280)

Screwdriver, self-retaining (226160)
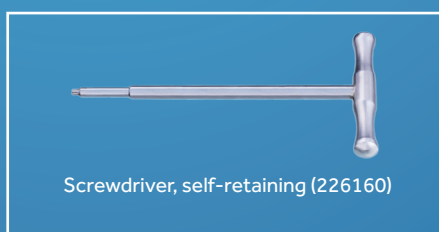
Distal Femoral Locking Compression Plates 4.5/5.0

Specification	
Thickness (mm)	6
Width (mm)	16
Material	PT

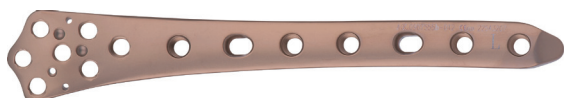| Code	Model No.	Size	Direction	Length (mm)
22527205	SDDG52	5H	Left	156
22527207	SDDG52	7H	Left	196
22527209	SDDG52	9H	Left	236
22527211	SDDG52	11H	Left	276
22527213	SDDG52	13H	Left	316
22527105	SDDG53	5H	Right	156
22527107	SDDG53	7H	Right	196
22527109	SDDG53	9H	Right	236
22527111	SDDG53	11H	Right	276
22527113	SDDG53	13H	Right	316

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

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

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, φ4.1mm	1
227110	Drill Bit with straighgt shank, φ4.1mm	2
226120	Guide Sleeve for K-Wire, φ2.0mm	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, φ5.0mm	1
221180	Allen Key	1
226190	Drill Bit for Screw Head Removal	1
10737230	Kirschner Wire, φ2.0mm	3
206110	Double Drill Guide 6.5/3.2	1
206120	Double Drill Guide 4.5/3.2	1
206240	Trephine	1
010040	Drill Bit, φ4.5mm	1
010020	Drill Bit, φ3.2mm	1
206170	Depth Gauge, 90mm	1
030100	T-handle with Quick Couping	1
020040	Tap, φ6.5mm	1
020030	Tap, φ4.5mm	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
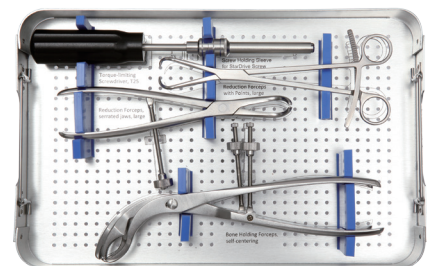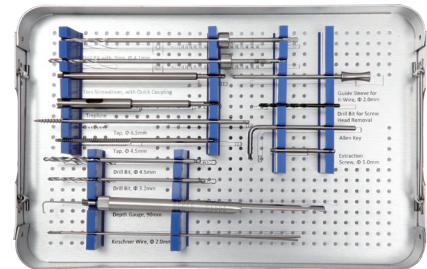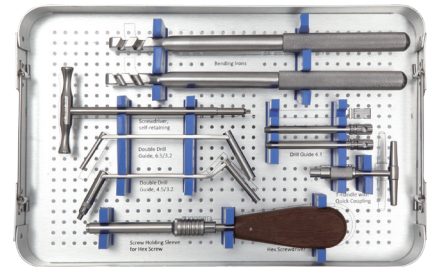
Optional Instrument

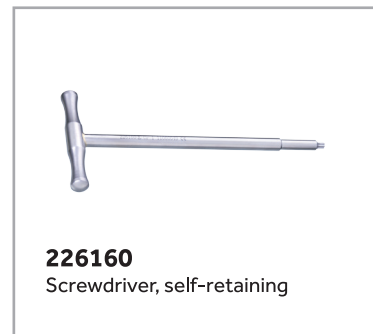| Code	Product Description	Qty.
898144	Hex Screwdriver (silicon handle)	1
206330	Plates Bender	1

Implant Case

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

MonoLoc Locking Plates System

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Limbs

MonoLoc 5.0mm Instrument

226100
Drill Guide 4.1

226110
Drill Bit with Stop, φ4.1mm

226120
Guide Sleeve for K-Wire, φ2.0mm

226151
Torque-limiting Screwdriver, T25

226140
Screw Holding Sleeve for
StarDrive Screw

226160
Screwdriver, self-retaining

226200
Torx Screwdriver,
with Quick Coupling

226170
Extraction Screw, φ5.0mm

221180
Allen Key

226190
Drill Bit for Screw Head Removal

10737230
Kirschner Wire, φ2.0mm

206110
Double Drill Guide 6.5/3.2

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