

Surgical Technique

HERBERT SCREW (HEX HEAD), 3.0/3.9mm Cannulated Compression Screw

about us

We deliver excellence in healthcare solutions across South Africa.

Founded in 2016, Jazzman Medical has grown to become a leading supplier of medical implants and equipment in South Africa. Our mission is to provide healthcare professionals with innovative, high-quality products that improve patient outcomes. Currently distributing in Gauteng, Northern Cape, Cape Town, Durban, we are looking to expand to other provinces and the global market.

Orthopaedic Implants



Specifically Designed for Problem Internal Fixation

The headless design of the Herbert Screw means that the screw is completely embedded in the bone, without any protrusions to cause tissue irritation even in intra-articular placement.

Cannulation helps ensure precise placement of the screw.

Herbert Cannulated Guide Pins hold the fragment and act as guides for drilling, tapping, and screw placement.

The Titanium used in fabricating these screws is highly biocompatible and corrosion resistant.

The thread design of the Herbert Screw creates compression and provides fracture stability. As the proximal threads engage the bone, the fracture is drawn together, helping to create and maintain stability of the fracture site.

INDICATIONS FOR USE

The Herbert Cannulated Compression Screw System (3.0mm and 3.9mm diameter) are indicated for fracture fixation, reconstruction of tectons, and arthrodesis of various bones and bone fragments including joint fusions (arthrodeses) in the foot and fixation of intra-articular fractures of the humerus, femur and tibia.

Standard screw use is appropriate where extreme precision in fragment alignment is imperative. Such locations might include fractures of the:

- Olecranon and malleolar region
- Distal femur
- Proximal tibia
- Distal tibia



1. GUIDE WIRE

After initial reduction of the fracture fragments is obtained, the specifically designed Herbert Cannulated Guide Pin is placed through the fragments to act as a Guide Wire through the Wire Sleeve $\text{\O}2.1/1.1\text{mm}$ (7-042-03) that is in turn placed in Protection Sleeve $\text{\O}2.2\text{mm}$ (7-042-02) for the rest of the placement operation. The Guide Pin should not perforate the opposite cortex.



Use the Depth Gauge (7-042-10) to measure the length of the Guide Pin in the bone. If the Guide perforates the opposite cortex, corresponding compensation must be made when selecting the implant length.

2. DEPTH GAUGE



Insert the Cannulated Drill Bit Stop, $\text{\O}2.2\text{mm}$ x Length 150mm (7-042-06) over the Guide Pin to the opposite cortex. The Drill Bit should be advanced until the built-in stop contacts the cortex of the bone.

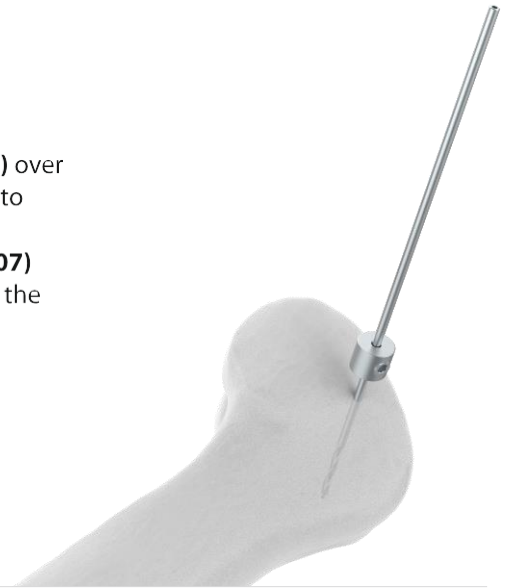
3. CANNULATED DRILL BIT



4. CANNULATED DRILL BIT WITH STOPPER

Insert the Cannulated Drill Bit with Stopper, Ø2.2mm x Length 150mm (**7-042-07**) over the Guide Pin and drill to the desired depth. At this time the surgeon may choose to drill 5mm less than the pilot length.

Option: The Cannulated Drill Bit with Stopper, Ø2.2mm x Length 150mm (**7-042-07**) may be inserted into a Jacob's Chuck to the appropriate calibration, thus allowing the surgeon to utilize the Chuck as an automatic stop.



5. CANNULATED SCREWDRIVER

Insert the Cannulated Screwdriver, Hex 2.0mm (**7-042-11**) over the Guide Pin and tap the channel to prepare for the leading screw threads of the implant. Tap depth should be equal to the depth created by the cannulated Drill Bit with Stopper, Ø2.2mm x Length 150mm (**7-042-07**).



6. INSERT SCREW

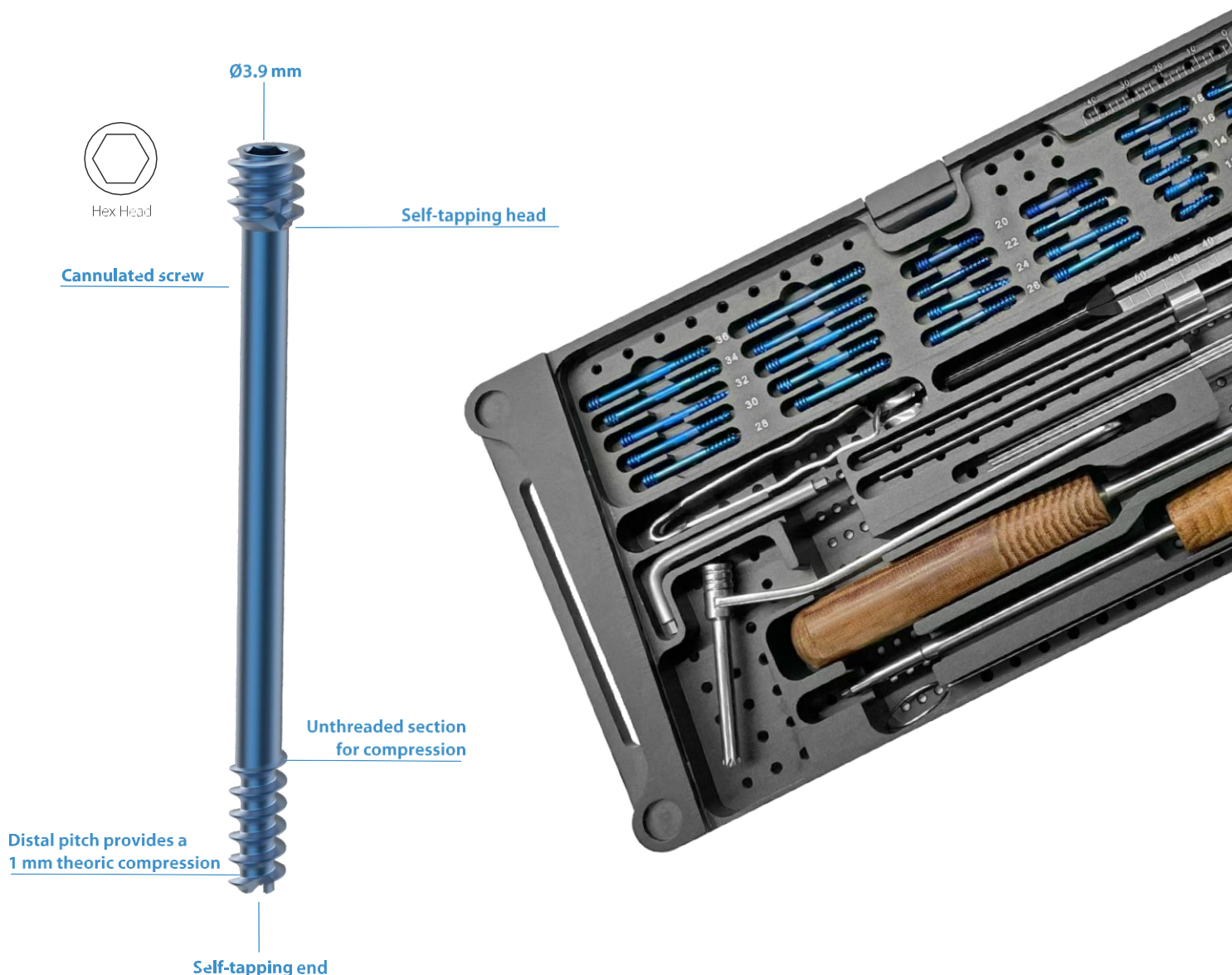
Using the Cannulated Screwdriver (**7-042-11**), insert the Herbert Cannulated Screw. As the trailing threads engage the bone, reduction is achieved. These trailing threads should be seated approximately 1mm below the cortex of the bone to ensure that there is no intra-articular protrusion or interference with the joint function.



DOUBLE THREADING FOR OPTIMAL COMPRESSION

Design Rationale and Main Features

The Compression Screw is easy to insert (over a guide wire) and provides efficient compression (through two separate threadings with different pitches, and an intermediate unthreaded section), thus ensuring quick, dependable internal fixation.



INDICATIONS

- Distal and proximal metatarsal osteotomies • SCARF osteotomy
- Uni and biocortical internal fixation (ex.: scaphoid) • Small bone fusion



HERBERT SCREW (HEX HEAD), 3.0/3.9mm Cannulated Compression Screw

Code	Length
TI-HC3.0/3.9.10	10mm, Titanium
TI-HC3.0/3.9.12	12mm, Titanium
TI-HC3.0/3.9.14	14mm, Titanium
TI-HC3.0/3.9.16	16mm, Titanium
TI-HC3.0/3.9.18	18mm, Titanium
TI-HC3.0/3.9.20	20mm, Titanium
TI-HC3.0/3.9.22	22mm, Titanium
TI-HC3.0/3.9.24	24mm, Titanium
TI-HC3.0/3.9.26	26mm, Titanium
TI-HC3.0/3.9.28	28mm, Titanium
TI-HC3.0/3.9.30	30mm, Titanium
TI-HC3.0/3.9.32	32mm, Titanium
TI-HC3.0/3.9.34	34mm, Titanium
TI-HC3.0/3.9.36	36mm, Titanium
TI-HC3.0/3.9.38	38mm, Titanium
TI-HC3.0/3.9.40	40mm, Titanium

7-042-01

Stylet Ø1.0mm



7-042-02

Protection Sleeve Ø2.2mm



7-042-03

Wire Sleeve Ø2.1/1.1mm



7-042-04

Guide Wire with Threaded Tip, Ø1.0mm x Thread Length 10mm x Length 120mm



7-042-05

Guide Wire, Ø1.1mm x Length 120mm



7-042-06

Cannulated Drill Bit Stop, Ø2.2mm x Length 150mm



Instrument

7-042-07 Cannulated Drill Bit with Stopper, Ø2.2mm x Length 150mm



7-042-08 Allen Key, Hex 2.5mm for Herbert Hex Screw



7-042-09 Screw Holding Forcep for Herbert Hex Screw



7-042-10 Measuring sleeve for Guide Wire upto 60mm



7-042-11 Cannulated Screwdriver, Hex 2.0mm



7-042-12 Screwdriver, Hex 2.0mm for Hebert Hex Screw



7-042 Herbert Hex Screw Implant & Instrument Set

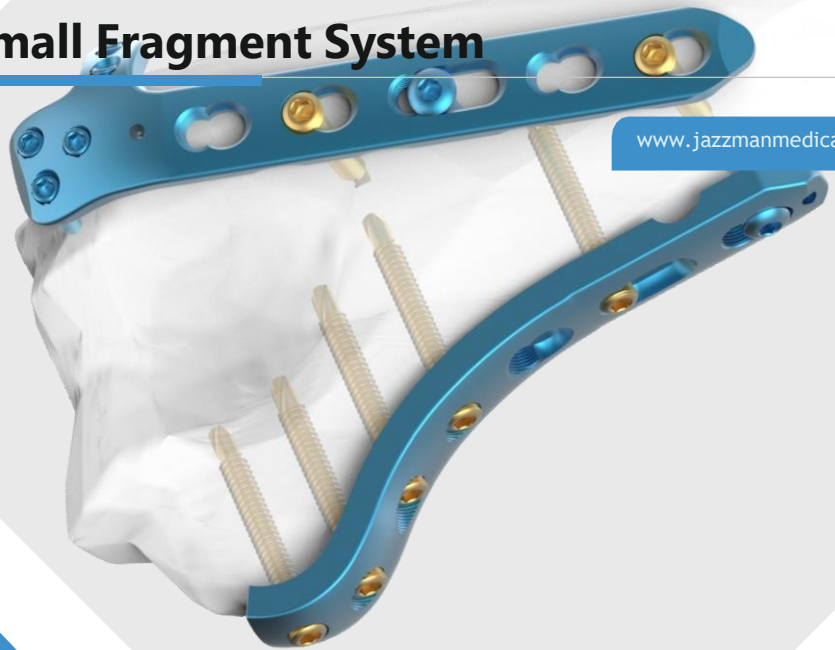


Code	Set Consisting of	Units
7-042-01	Stylet Ø1.0mm	1
7-042-02	Protection Sleeve Ø2.2mm	1
7-042-03	Wire Sleeve Ø2.1/1.1mm	1
7-042-04	Guide Wire with Threaded Tip, Ø1.0mm x Thread Length 10mm x Length 120mm	3
7-042-05	Guide Wire, Ø1.1mm x Length 120mm	3
7-042-06	Cannulated Drill Bit Stop, Ø2.2mm x Length 150mm	1
7-042-07	Cannulated Drill Bit with Stopper, Ø2.2mm x Length 150mm	1
7-042-08	Allen Key, Hex 2.5mm for Herbert Hex Screw	1
7-042-09	Screw Holding Forcep for Herbert Hex Screw	1
7-042-10	Measuring sleeve for Guide Wire upto 60mm	1
7-042-11	Cannulated Screwdriver, Hex 2.0mm	1
7-042-12	Screwdriver, Hex 2.0mm for Hebert Hex Screw	1
7-042-13	Container for Herbert Hex Screw Implant & Instrument Set	1



Surgical Technique

3.5mm Wise-Lock Small Fragment System



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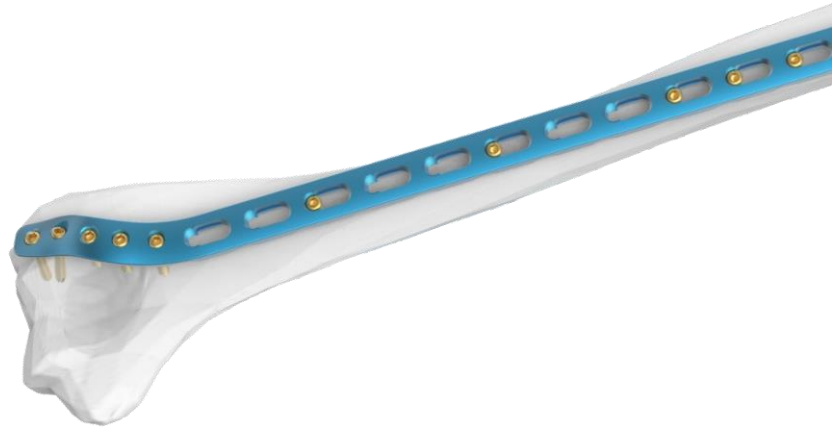
General Indications

Auxein Wise-Lock Small Fragment are intended for fixation of fractures, osteotomies and nonunions of the clavicle, scapula, olecranon, humerus, radius, ulna, pelvis, distal tibia, and fibula, particularly in osteopenic bone.

Specific Indications

3.5mm Extra Articular Distal Humerus Plate

- Extra-articular fractures of the distal humerus
- Malunions of the distal humerus
- Non-unions of the distal humerus



3.5mm Wise-Lock Metaphyseal plate for distal medial humerus

The Wise-Lock Metaphyseal Plate is an anatomically precontoured plate that permits an optimal treatment of juxta-articular distal humerus fractures. It takes into account the following peculiarities of the distal humerus:

- Thin soft-tissue envelope
- Complex shape of the bone



3.5mm Wise-Lock Dorsolateral Distal Humerus Plate with Support

The 3.5 mm Wise-Lock Dorsolateral Distal Humerus Plates are indicated for intra-articular fractures of the distal humerus, comminuted supracondylar fractures, osteotomies, and nonunions of the distal humerus.

3.5mm Wise-Lock Olecranon plate

- Complex extra- and intra-articular olecranon fractures
- Pseudoarthroses of the proximal ulna
- Osteotomies
- Simple olecranon fractures



3.5mm Wise-Lock Small Fragment System

3.5mm Wise-Lock Medial Distal Tibia Plate

The 3.5mm Wise-Lock Medial Distal Tibia Plate is intended for fixation of complex intra and extra-articular fractures with osteotomies of the distal tibia.



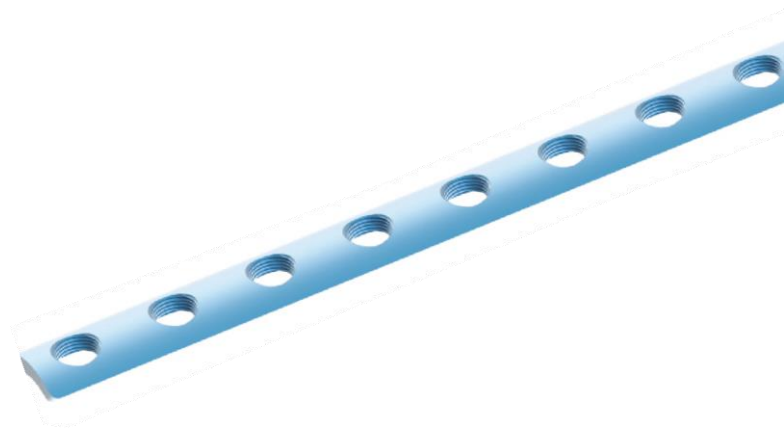
3.5mm Wise-Lock Anterolateral Distal Tibia Plate

The 3.5mm Wise-Lock Anterolateral Distal Tibia Plate is indicated for fractures, osteotomies and non-unions of Distal Tibia.



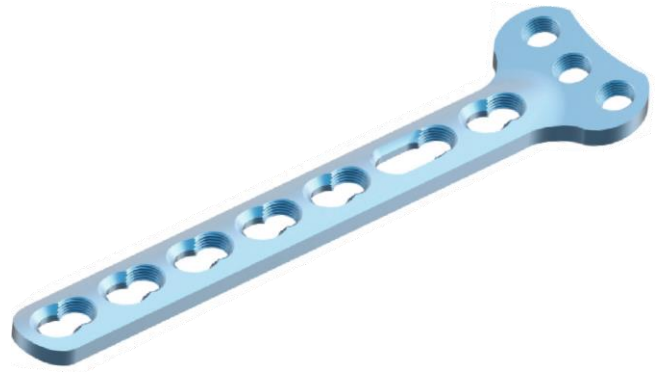
3.5mm Wise-Lock One Third Tubular Plate

The 3.5mm Wise-Lock One Third Tubular Plate is indicated for fractures of long and small bones. The plate should only be used for load bearing purposes, e.g. buttressing, tension banding, neutralization and compression.



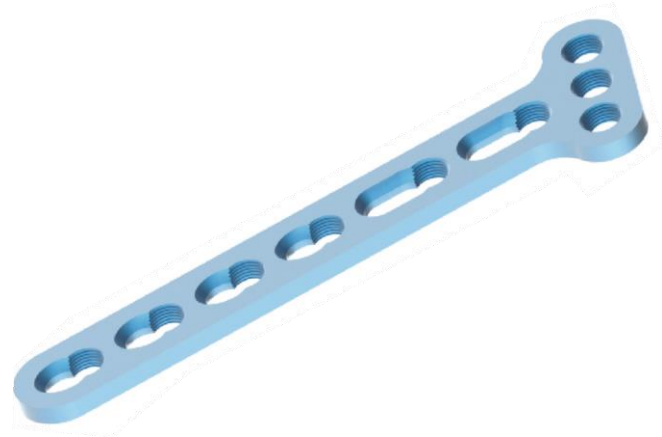
3.5mm Wise-Lock Small "T" Plate, Right Angled

This plate is used for fixation of small bone fragments using the five standard AO plating principles (buttress plate, neutralization plate, tension band plate, bridge plate, compression plate) fracture fixation and fixation after mal-unions, non-unions; e.g. including but not limited to distal radius, proximal and distal tibia, proximal Humerus, clavicular.



3.5mm Wise-Lock Small "T" Plate, Oblique Angled

These plates are indicated for extra-articular, partial articular & complete articular fractures of Distal Radius.



3.5mm Wise-Lock Small Dynamic Compression Plate with LC under cut

This plate is indicated for fractures and osteotomies of small bones such as radius, ulna, clavicle and fibula.



Fixation Principles

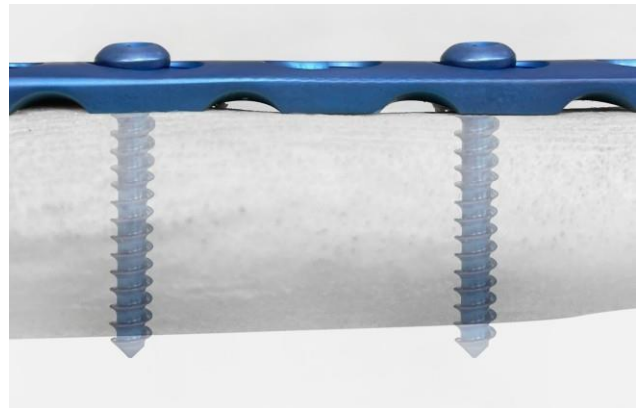
The following points distinguish treatment using locking screw technology from conventional plating techniques:

- It enables fracture treatment using compression plating with conventional cortical or cancellous bone screws
- Wise-Lock plate can also be used as an internal fixator and permits stable bridging over shattered zones
- The Wise-Lock system permits the combination of conventional and locking screws
- Unicortical locking screw permits better vascularity

Note: The Wise-Lock system applies to many different plate types and is therefore suitable for a large number of fracture types. For that reason, this technique guide does not deal with any specific fracture type.

Bicortical screw fixation

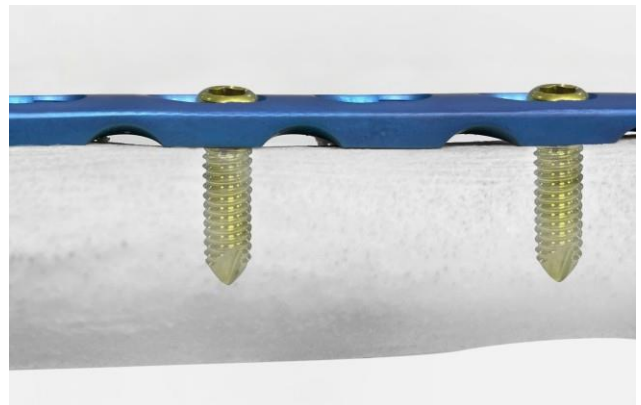
Bicortical screw fixation has long been the traditional method of compressing a plate to the bone where friction between the plate and the bone maintains stability. Screw stability and load transfer are accomplished at two points along the screw: the near and far cortices.



Unicortical screw fixation

Unicortical locking screws provide stability and load transfer only at the near cortex due to the threaded connection between the plate and the screw. Screw stability and load transfer are accomplished at two points along the screw: the screwhead and near cortex. Because the screw is locked to the plate, fixation does not rely solely on the pullout strength of the screw or on maintaining friction between the plate and the bone.

- a. Bicortical screws require two (2) cortices to achieve stability.
- b. Unicortical screws utilize the Wise-Lock screw and the near cortex to achieve stability.

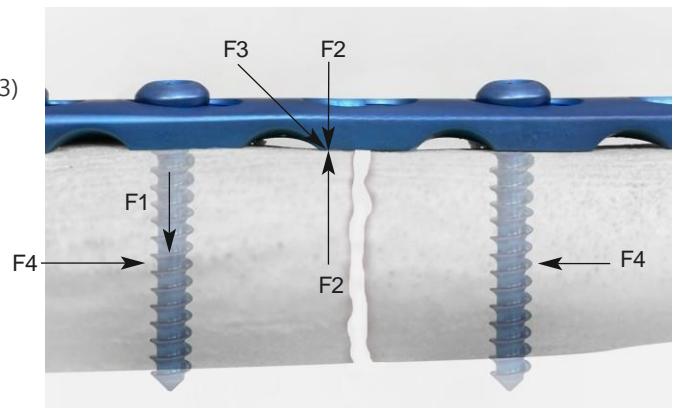


The following examples show the biomechanical features of conventional plating techniques, locked or bridge plating techniques, and a combination of both.

Conventional plating

Absolute stability

The tensile force (F1) originating from tightening the screws presses the plate onto the bone (F2). The developing friction (F3) between the plate and the bone leads to stable plate fixation. To ensure absolute stability, the friction resistance must be higher than the axial forces (F4) arising during rehabilitation.



Anatomic contouring of the plate

The aim of internal fixation is anatomic reduction, particularly in articular fractures. Therefore, the plate must be contoured to the shape of the bone.

Lag screw

Interfragmentary compression is accomplished by using a lag screw. This is particularly important in intra-articular fractures which require a precise reduction of the joint surfaces. Lag screws can be angled in the plate hole, allowing placement of the screw perpendicular to the fracture line.

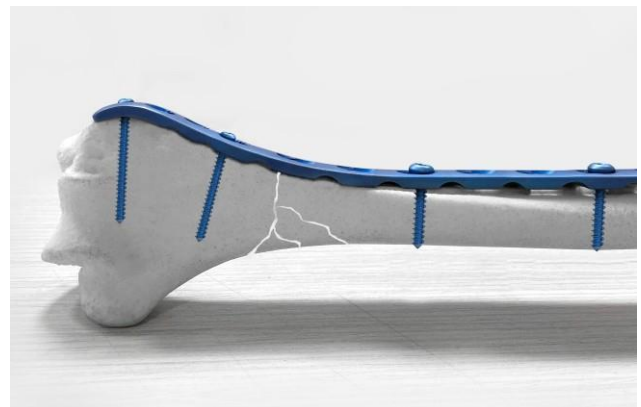
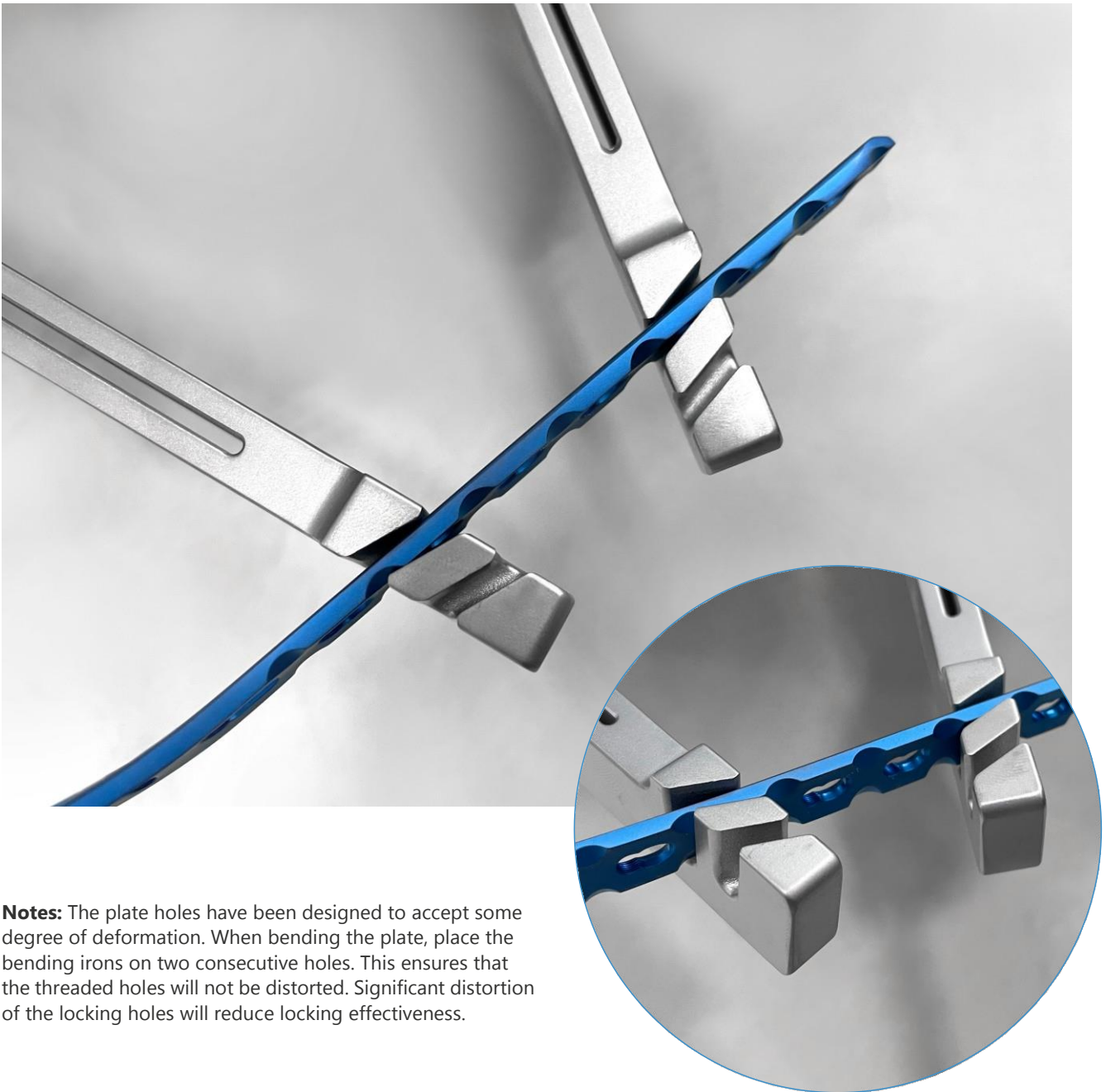


Plate selection

The plates are available in various lengths. If necessary, use a bending template to determine plate length.

Contouring

Use the bending instruments to contour the Wise-Lock plate to the anatomy.



Notes: The plate holes have been designed to accept some degree of deformation. When bending the plate, place the bending irons on two consecutive holes. This ensures that the threaded holes will not be distorted. Significant distortion of the locking holes will reduce locking effectiveness.

Screw Insertion

Determine whether standard 3.5 mm cortical screws, 4.0 mm cancellous screws or 3.5 mm Wise-Lock screws will be used for fixation. A combination of all may be used.

Note: If a combination of cortical, cancellous and Wise-Lock screws is used, a standard screw should be used first to pull the plate to the bone.

Warning: If a Wise-Lock screw is used first, care should be taken to ensure that the plate is held securely to the bone to avoid spinning of the plate about the bone.

Insertion of a cortical or cancellous bone screw

Use the 3.5 mm universal drill guide for an eccentric (compression) or neutral (buttress) insertion of cortical screws.

Neutral insertion of a standard screw

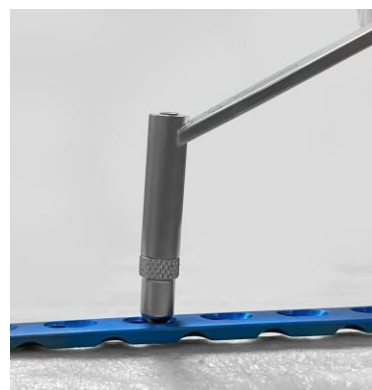
When pressing the universal drill guide into the DCU portion of the Wise-Lock plate, it will center itself and allow neutral predrilling.



Neutral position

Dynamic compression, eccentric insertion of a cortical screw

To drill a hole for dynamic compression, place the universal drill guide eccentrically at the edge of the DCU portion of the Wise-Lock plate hole, without applying pressure. Tightening of the cortical screws will result in dynamic compression.



Dynamic compression

3.5mm Wise-Lock Small Fragment System

Drill a hole through the drill guide using a 2.5mm Drill bit.



Use a depth gauge to measure the required screw length.



Select the Screw of appropriate length as per measurement and insert it using the Screwdriver.



Insertion of 3.5 mm Wise-Lock screws

Reminder: The Wise-Lock screw is not a lag screw. Use standard screws when requiring a precise anatomical reduction (e.g., joint surfaces) or interfragmentary compression. Before inserting the first Wise-Lock screw, perform anatomical reduction and fix the fracture with lag screws, if necessary. After the insertion of Wise-Lock screws, an anatomical reduction will no longer be possible without loosening the Wise-Lock screw.

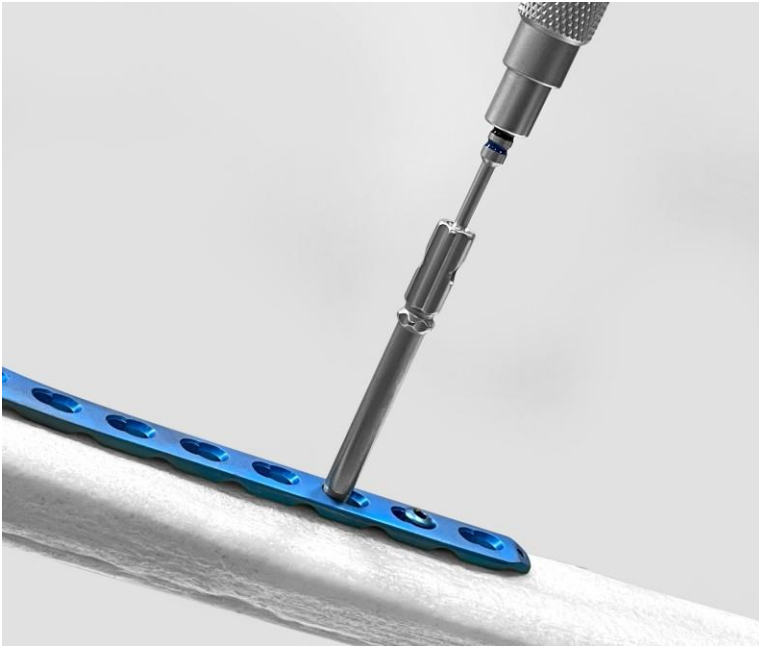
Screw the 2.8 mm threaded drill guide into an Wise-Lock plate hole until fully seated.



Note: Since the direction of a Wise-Lock screw is determined by plate design, final screw position may be verified with a K-wire prior to insertion. This becomes especially important when the plate has been contoured or applied in metaphyseal regions around joint surfaces.

Warning: Do not try to bend the plate using the threaded drill guide because damage may occur to the plate hole threads.

3.5mm Wise-Lock Small Fragment System



Use the 2.8 mm drill bit to drill the desired depth.



Remove the threaded drill guide and use the depth gauge to determine screw length.

Insert the Wise-Lock screw under power using a 1.5Nm torque limiting attachment and screwdriver shaft.

Note: Recheck each Wise-Lock screw before closing to verify that the screws are securely locked to the plate. Screwheads must be flush with the plate in the locked position before they can be considered fully seated.

Warning: Always use a torque limiting attachment (TLA) when using power to insert Wise-Lock screws.



Insertion of 2.7 mm Wise-Lock screws

Few Wise-lock plates are designed to accommodate 2.7mm Wise-Lock screws in the head portion of the plate. Refer to the following technique for 2.7mm Wise-lock screw insertion.

For 2.7mm Wise-lock screw Insertion, the same steps as mentioned above for 3.5mm Wise-lock screw will be used with only change in instruments as described below:

- The Ø2.7mm Threaded drill guide is used in combination with 2.0mm Drill bit to drill bone for screw insertion. The marking on drill bit indicates the required screw length.

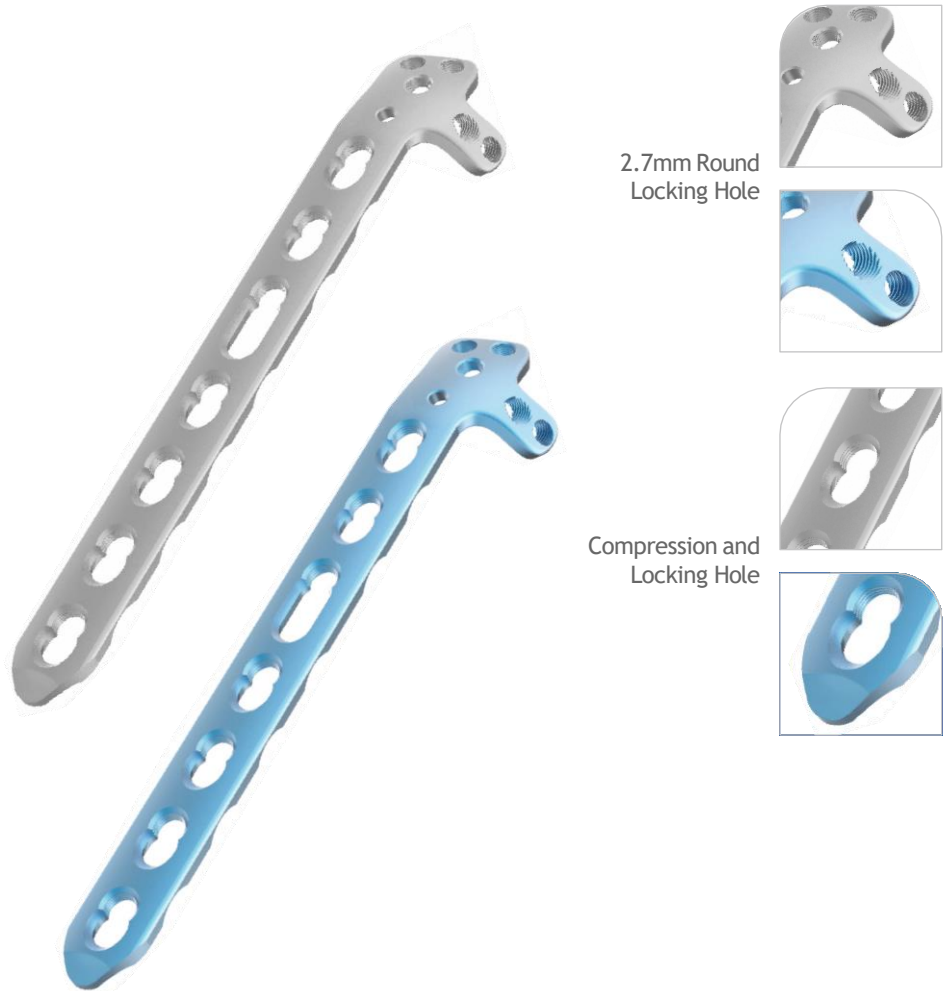


- The depth gauge can also be used for determining screw length.



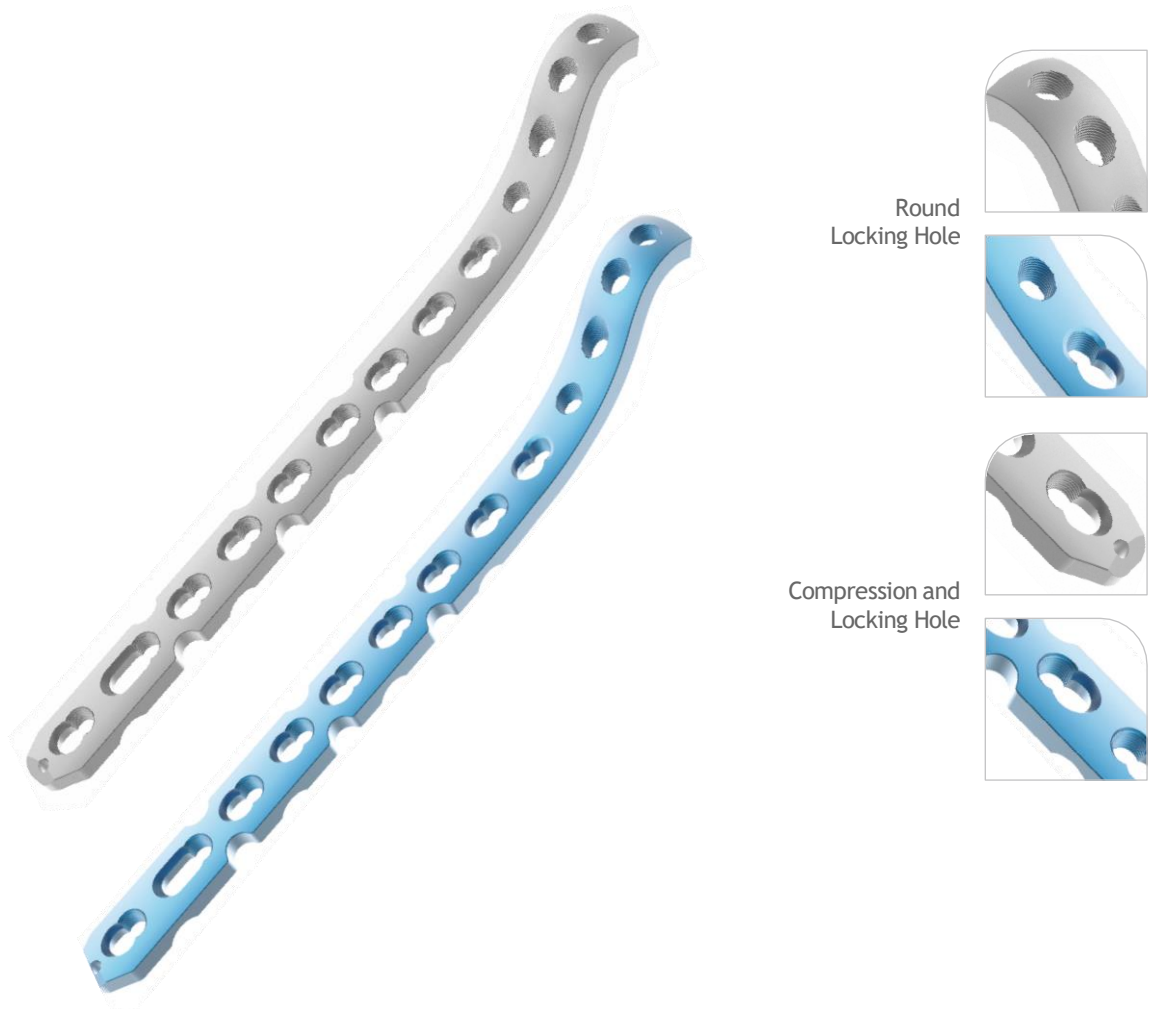
- Finally the screw is inserted using the screwdriver in attachment in combination with 0.8Nm torque limiting attachment.

2.7/3.5mm Wise-Lock Dorsolateral Distal Humerus Plate with Lateral Support



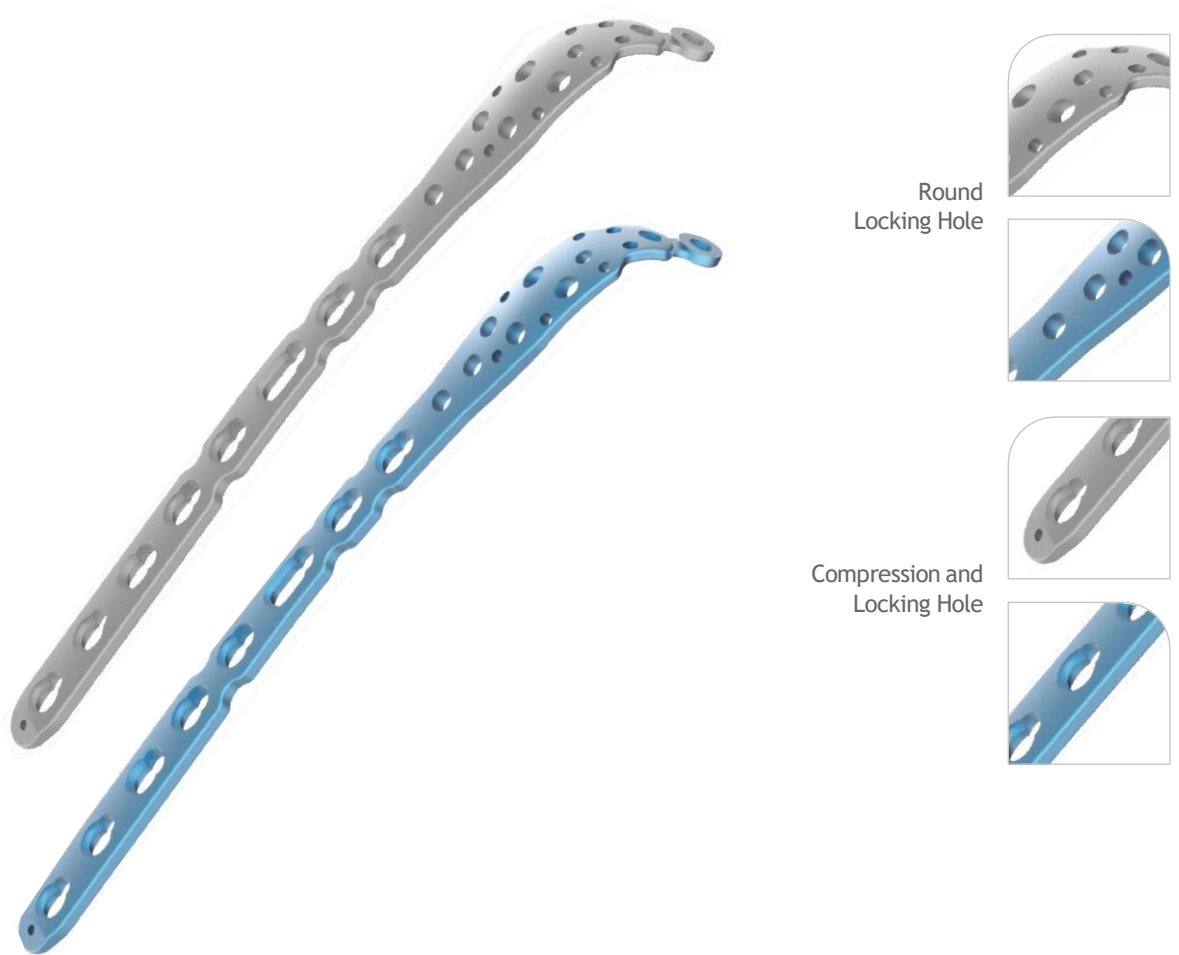
Holes	Left Direction		Right Direction	
	Stainless Steel	Titanium	Stainless Steel	Titanium
3	743.103L	TI-743.103L	743.103R	TI-743.103R
5	743.105L	TI-743.105L	743.105R	TI-743.105R
7	743.107L	TI-743.107L	743.107R	TI-743.107R
9	743.109L	TI-743.109L	743.109R	TI-743.109R
14	743.114L	TI-743.114L	743.114R	TI-743.114R

3.5mm Wise-Lock Metaphyseal Plate for Distal Medial Humerus



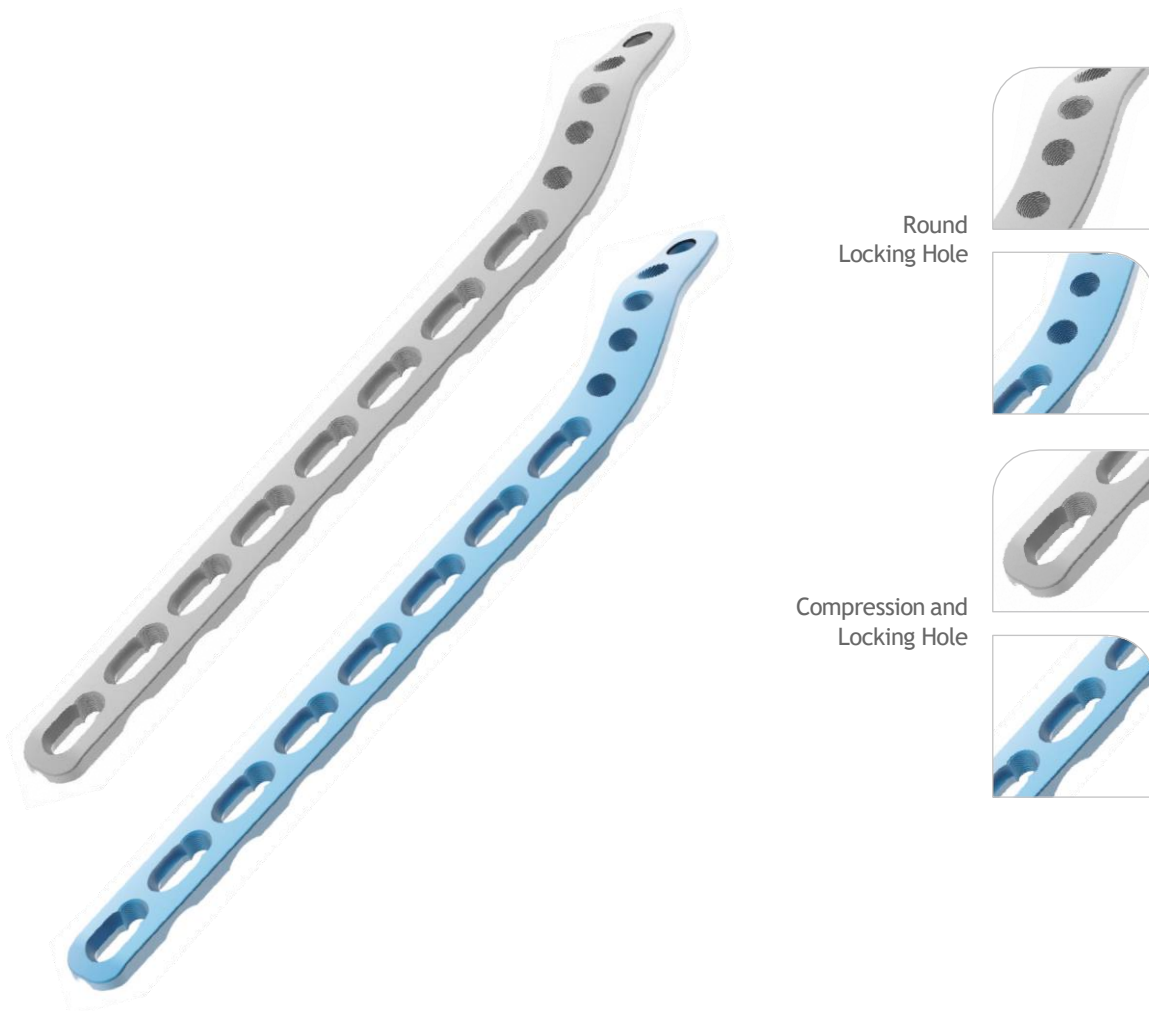
Holes	Stainless Steel	Titanium
7	738.107	TI-738.107
9	738.109	TI-738.109
11	738.111	TI-738.111
13	738.113	TI-738.113
15	738.115	TI-738.115

3.5mm Wise-Lock Olecranon Plate



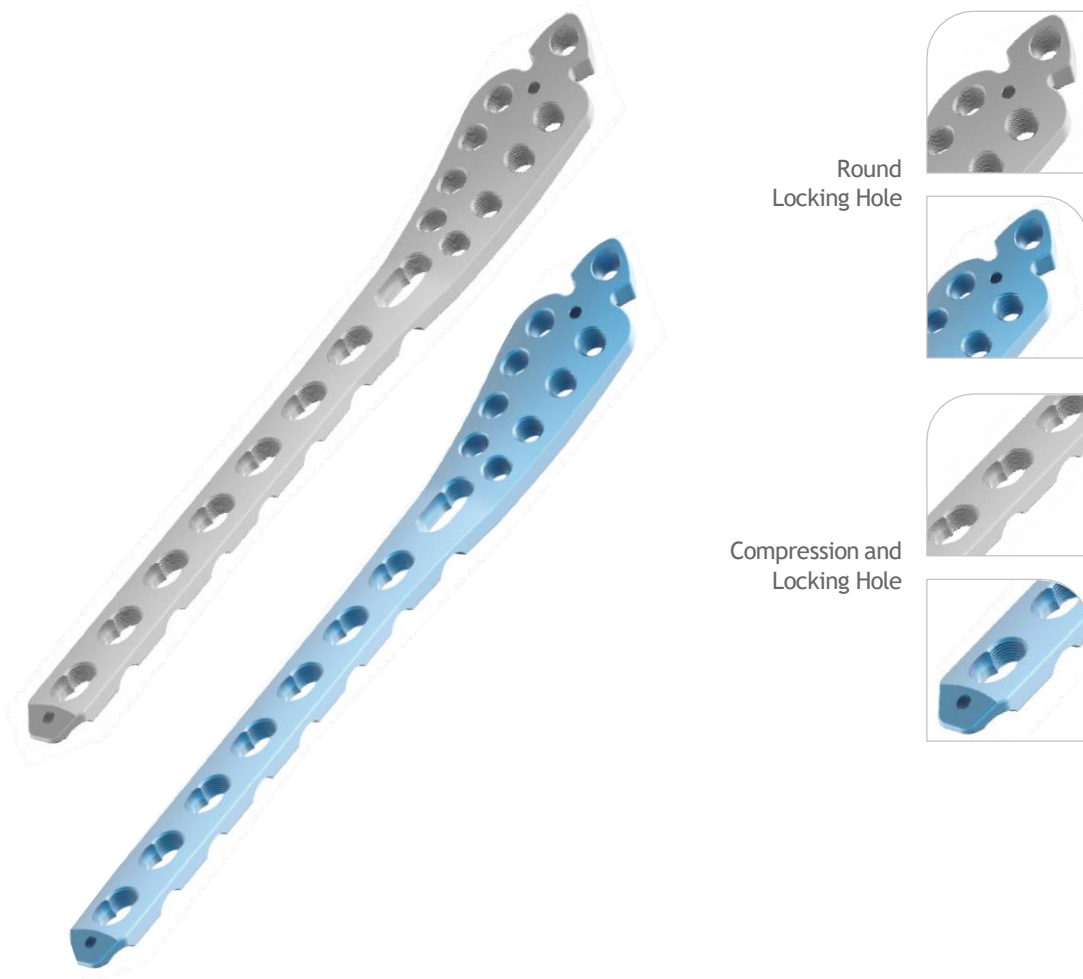
Holes	Left Direction		Right Direction	
	Stainless Steel	Titanium	Stainless Steel	Titanium
2	758.102L	TI-758.102L	758.102R	TI-758.102R
4	758.104L	TI-758.104L	758.104R	TI-758.104R
6	758.106L	TI-758.106L	758.106R	TI-758.106R
8	758.108L	TI-758.108L	758.108R	TI-758.108R
10	758.110L	TI-758.110L	758.110R	TI-758.110R
12	758.112L	TI-758.112L	758.112R	TI-758.112R

3.5mm Wise-Lock Extra-Articular Distal Humerus Plate



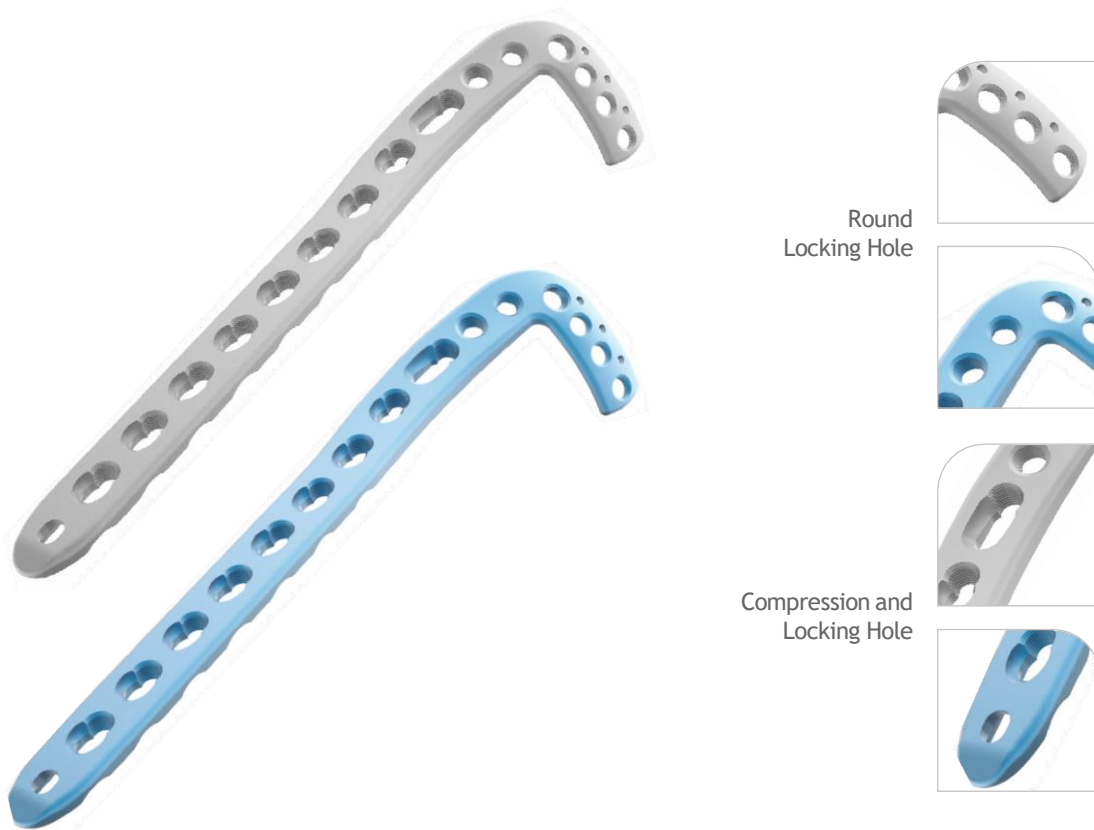
Holes	Left Direction		Right Direction	
	Stainless Steel	Titanium	Stainless Steel	Titanium
4	583.004L	TI-583.004L	583.004R	TI-583.004R
6	583.006L	TI-583.006L	583.006R	TI-583.006R
8	583.008L	TI-583.008L	583.008R	TI-583.008R
10	583.010L	TI-583.010L	583.010R	TI-583.010R
12	583.012L	TI-583.012L	583.012R	TI-583.012R
14	583.014L	TI-583.014L	583.014R	TI-583.014R

3.5mm Wise-Lock Medial Distal Tibia Plate



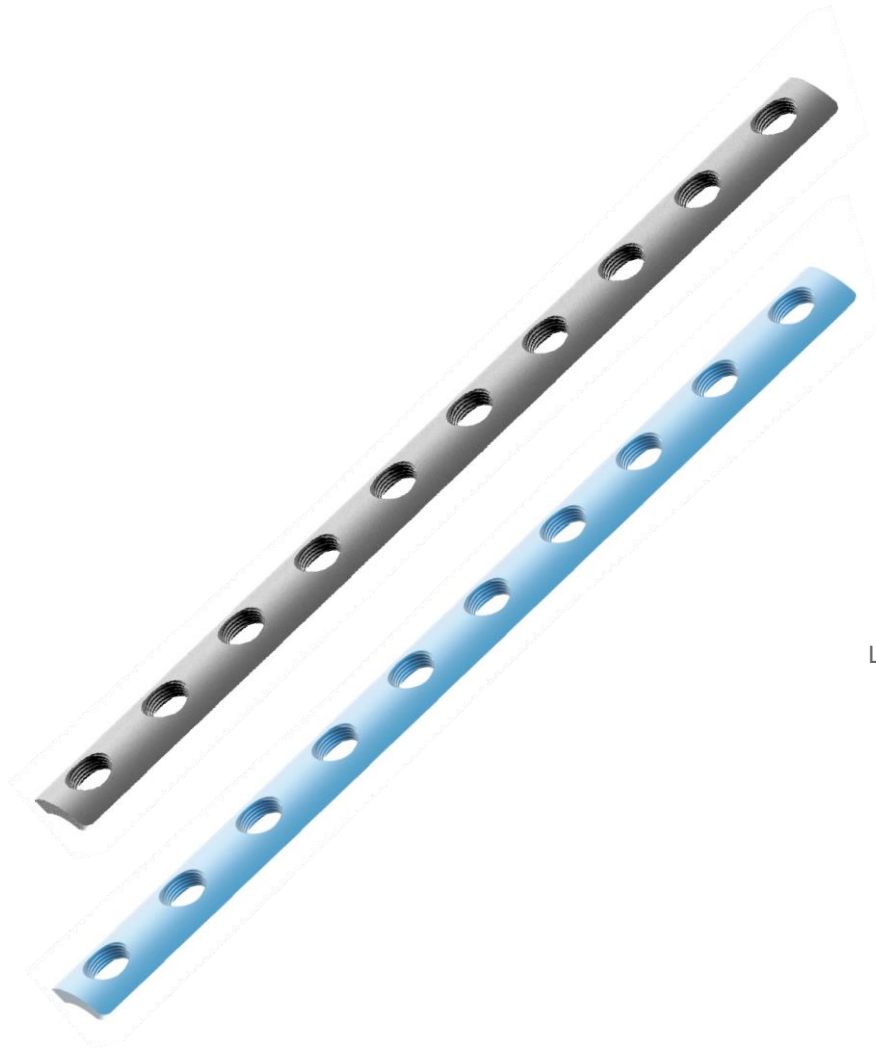
Holes	Left Direction		Right Direction	
	Stainless Steel	Titanium	Stainless Steel	Titanium
4	746.104L	TI-746.104L	746.104R	TI-746.104R
6	746.106L	TI-746.106L	746.106R	TI-746.106R
8	746.108L	TI-746.108L	746.108R	TI-746.108R
10	746.110L	TI-746.110L	746.110R	TI-746.110R
12	746.112L	TI-746.112L	746.112R	TI-746.112R
14	746.114L	TI-746.114L	746.114R	TI-746.114R

3.5mm Wise-Lock Anterolateral Distal Tibia Plate

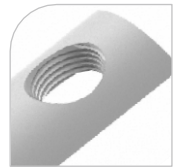


Holes	Left Direction		Right Direction	
	Stainless Steel	Titanium	Stainless Steel	Titanium
5	WS1.05	TI-WS1.05	WS2.05	TI-WS2.05
7	WS1.07	TI-WS1.07	WS2.07	TI-WS2.07
9	WS1.09	TI-WS1.09	WS2.09	TI-WS2.09
11	WS1.11	TI-WS1.11	WS2.11	TI-WS2.11
13	WS1.13	TI-WS1.13	WS2.13	TI-WS2.13
15	WS1.15	TI-WS1.15	WS2.15	TI-WS2.15
17	WS1.17	TI-WS1.17	WS2.17	TI-WS2.17
19	WS1.19	TI-WS1.19	WS2.19	TI-WS2.19
21	WS1.21	TI-WS1.21	WS2.21	TI-WS2.21

3.5mm Wise-Lock One Third Tubular Plate

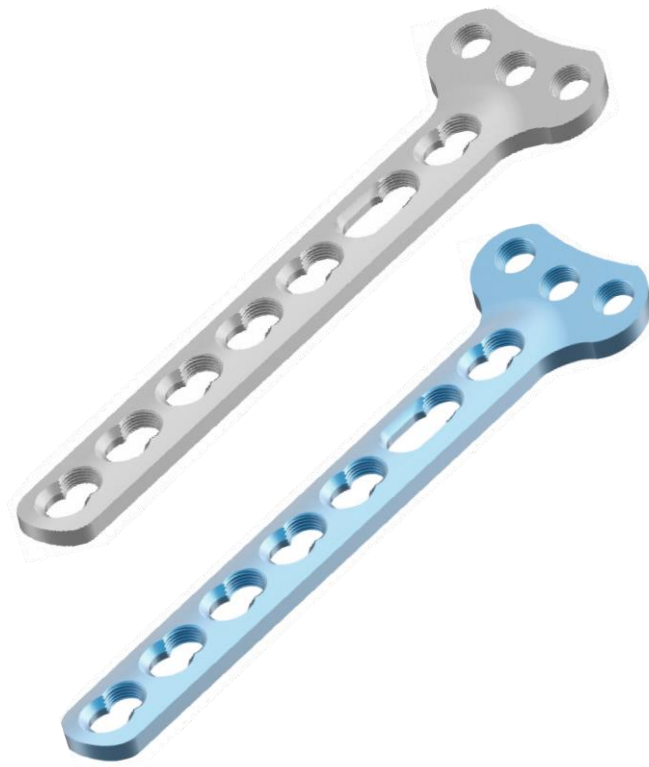


Round
Locking Hole



Holes	Stainless Steel	Titanium
4	702.304	TI-702.304
5	702.305	TI-702.305
6	702.306	TI-702.306
7	702.307	TI-702.307
8	702.308	TI-702.308
9	702.309	TI-702.309
10	702.310	TI-702.310
11	702.311	TI-702.311
12	702.312	TI-702.312

3.5mm Wise-Lock Small "T" Plate, Right Angled (3 Head Holes)



Round
Locking Hole

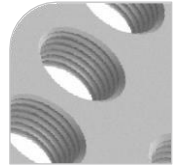
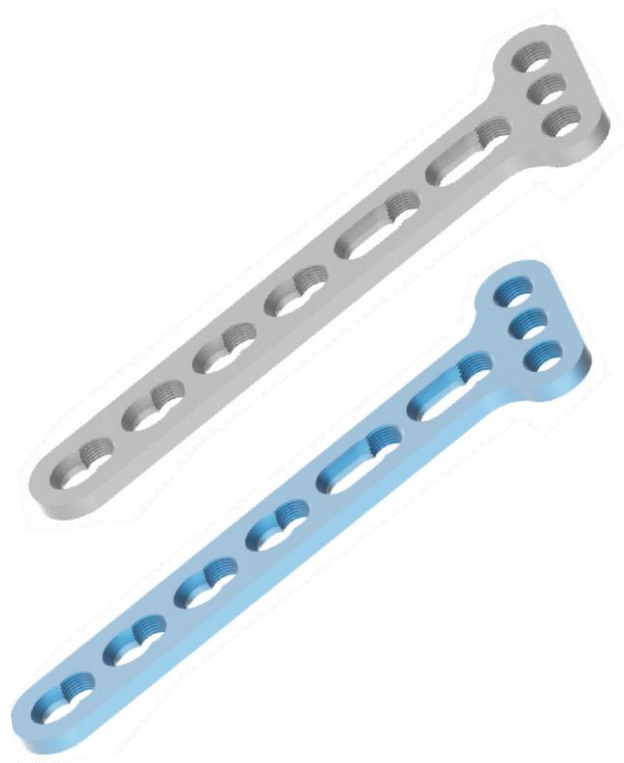


Compression and
Locking Hole



Holes	Stainless Steel	Titanium
3	709.103	TI-709.103
4	709.104	TI-709.104
5	709.105	TI-709.105
6	709.106	TI-709.106

3.5mm Wise-Lock Small "T" Plate, Oblique Angled



Round Locking Hole

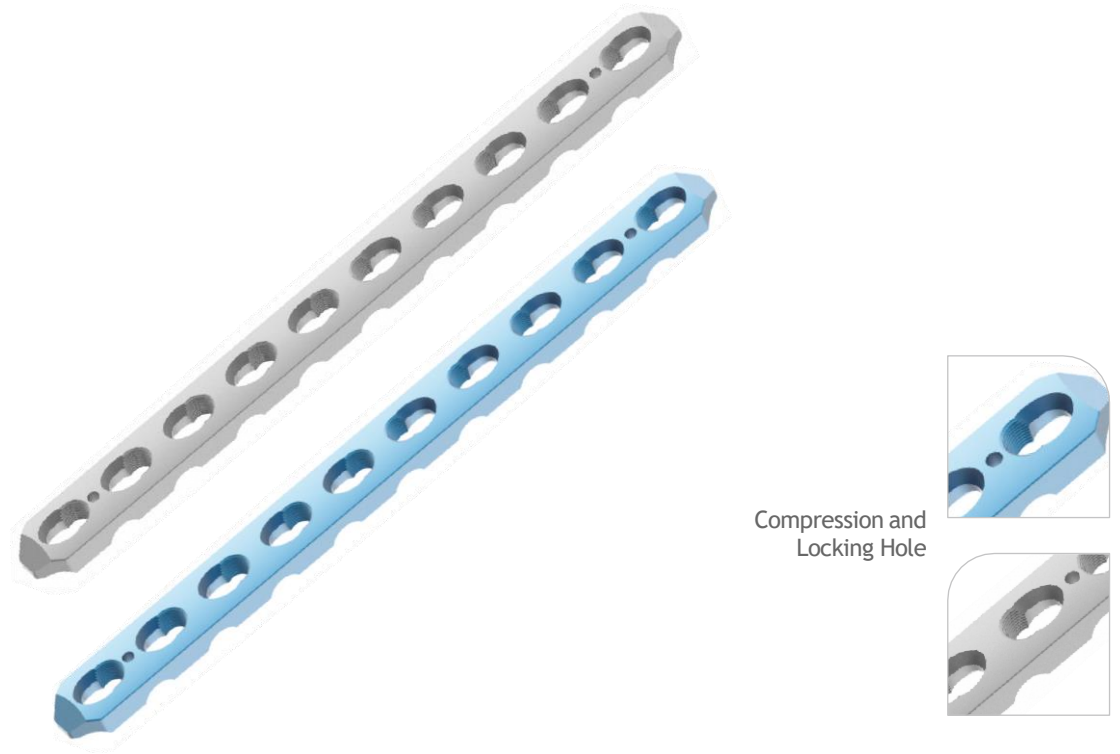


Compression and Locking Hole



Holes	Left Direction		Right Direction	
	Stainless Steel	Titanium	Stainless Steel	Titanium
3	712.103L	TI-712.103L	712.103R	TI-712.103R
4	712.104L	TI-712.104L	712.104R	TI-712.104R
5	712.105L	TI-712.105L	712.105R	TI-712.105R
6	712.106L	TI-712.106L	712.106R	TI-712.106R

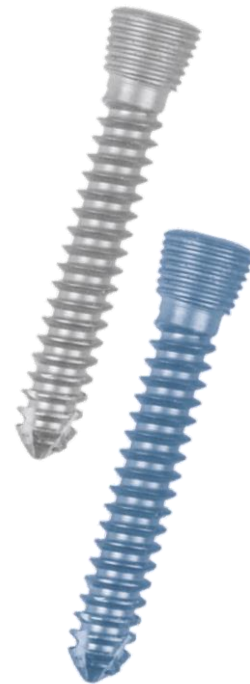
3.5mm Wise-Lock Small Dynamic Compression Plate with LC under cuts



Holes	Stainless Steel	Titanium
5	721.205	TI-721.205
6	721.206	TI-721.206
7	721.207	TI-721.207
8	721.208	TI-721.208
9	721.209	TI-721.209
10	721.210	TI-721.210
11	721.211	TI-721.211
12	721.212	TI-721.212

2.7mm Wise-Lock Screw, Self-Tapping (Hex Head)

Length (mm)	Stainless Steel	Titanium
10	118.010	TI-118.010
12	118.012	TI-118.012
14	118.014	TI-118.014
16	118.016	TI-118.016
18	118.018	TI-118.018
20	118.020	TI-118.020
22	118.022	TI-118.022
24	118.024	TI-118.024
26	118.026	TI-118.026
28	118.028	TI-118.028
30	118.030	TI-118.030
32	118.032	TI-118.032
34	118.034	TI-118.034
36	118.036	TI-118.036
38	118.038	TI-118.038
40	118.040	TI-118.040
42	118.042	TI-118.042
44	118.044	TI-118.044
46	118.046	TI-118.046
48	118.048	TI-118.048
50	118.050	TI-118.050
52	118.052	TI-118.052
54	118.054	TI-118.054
56	118.056	TI-118.056
58	118.058	TI-118.058
60	118.060	TI-118.060



3.5mm Wise-Lock Screw, Self-Tapping (Hex Head)

Length (mm)	Stainless Steel	Titanium
10	117.010	TI-117.010
12	117.012	TI-117.012
14	117.014	TI-117.014
16	117.016	TI-117.016
18	117.018	TI-117.018
20	117.020	TI-117.020
22	117.022	TI-117.022
24	117.024	TI-117.024
26	117.026	TI-117.026
28	117.028	TI-117.028
30	117.030	TI-117.030
* 32	117.032	TI-117.032
* 34	117.034	TI-117.034
35	117.035	TI-117.035
* 36	117.036	TI-117.036
* 38	117.038	TI-117.038
40	117.040	TI-117.040
* 42	117.042	TI-117.042
* 44	117.044	TI-117.044
45	117.045	TI-117.045
* 46	117.046	TI-117.046
* 48	117.048	TI-117.048
50	117.050	TI-117.050
* 52	117.052	TI-117.052
* 54	117.054	TI-117.054
55	117.055	TI-117.055
* 56	117.056	TI-117.056
* 58	117.058	TI-117.058
60	117.060	TI-117.060
65	117.065	TI-117.065
70	117.070	TI-117.070
75	117.075	TI-117.075
80	117.080	TI-117.080



* Sizes not available in Screw Caddy

3.5mm Wise-Lock Screw, Self-Drilling (Hex Head)

Length (mm)	Stainless Steel	Titanium
10	117.210	TI-117.210
12	117.212	TI-117.212
14	117.214	TI-117.214
16	117.216	TI-117.216
18	117.218	TI-117.218
20	117.220	TI-117.220
22	117.222	TI-117.222
24	117.224	TI-117.224
26	117.226	TI-117.226
28	117.228	TI-117.228
30	117.230	TI-117.230
* 32	117.232	TI-117.232
* 34	117.234	TI-117.234
* 36	117.236	TI-117.236
* 38	117.238	TI-117.238
40	117.240	TI-117.240
* 42	117.242	TI-117.242
* 44	117.244	TI-117.244
* 46	117.246	TI-117.246
* 48	117.248	TI-117.248
50	117.250	TI-117.250
* 52	117.252	TI-117.252
* 54	117.254	TI-117.254
* 56	117.256	TI-117.256
* 58	117.258	TI-117.258
60	117.260	TI-117.260



* Sizes not available in Screw Caddy

3.5mm Cortical Screw, Self-Tapping, (Hex Head)

Length (mm)	Stainless Steel	Titanium
10	104.210	TI-104.210
12	104.212	TI-104.212
14	104.214	TI-104.214
16	104.216	TI-104.216
18	104.218	TI-104.218
20	104.220	TI-104.220
22	104.222	TI-104.222
24	104.224	TI-104.224
26	104.226	TI-104.226
28	104.228	TI-104.228
30	104.230	TI-104.230
32	104.232	TI-104.232
34	104.234	TI-104.234
36	104.236	TI-104.236
38	104.238	TI-104.238
40	104.240	TI-104.240
42	104.242	TI-104.242
44	104.244	TI-104.244
46	104.246	TI-104.246
48	104.248	TI-104.248
50	104.250	TI-104.250
* 55	104.255	TI-104.255
* 60	104.260	TI-104.260
* 65	104.265	TI-104.265
* 70	104.270	TI-104.270
* 75	104.275	TI-104.275
* 80	104.280	TI-104.280
* 85	104.285	TI-104.285
* 90	104.290	TI-104.290



* Sizes not available in Screw Caddy

4.0mm Cancellous Screw, Short Thread

Length (mm)	Stainless Steel	Titanium
12	109.012	TI-109.012
14	109.014	TI-109.014
16	109.016	TI-109.016
18	109.018	TI-109.018
20	109.020	TI-109.020
22	109.022	TI-109.022
24	109.024	TI-109.024
26	109.026	TI-109.026
28	109.028	TI-109.028
30	109.030	TI-109.030
32	109.032	TI-109.032
34	109.034	TI-109.034
36	109.036	TI-109.036
38	109.038	TI-109.038
40	109.040	TI-109.040
45	109.045	TI-109.045
50	109.050	TI-109.050
55	109.055	TI-109.055
60	109.060	TI-109.060



4.0mm Cancellous Screw, Full Thread

Length (mm)	Stainless Steel	Titanium
12	110.012	TI-110.012
14	110.014	TI-110.014
16	110.016	TI-110.016
18	110.018	TI-110.018
20	110.020	TI-110.020
22	110.022	TI-110.022
24	110.024	TI-110.024
26	110.026	TI-110.026
28	110.028	TI-110.028
30	110.030	TI-110.030
32	110.032	TI-110.032
34	110.034	TI-110.034
36	110.036	TI-110.036
38	110.038	TI-110.038
40	110.040	TI-110.040
45	110.045	TI-110.045
50	110.050	TI-110.050
55	110.055	TI-110.055
60	110.060	TI-110.060



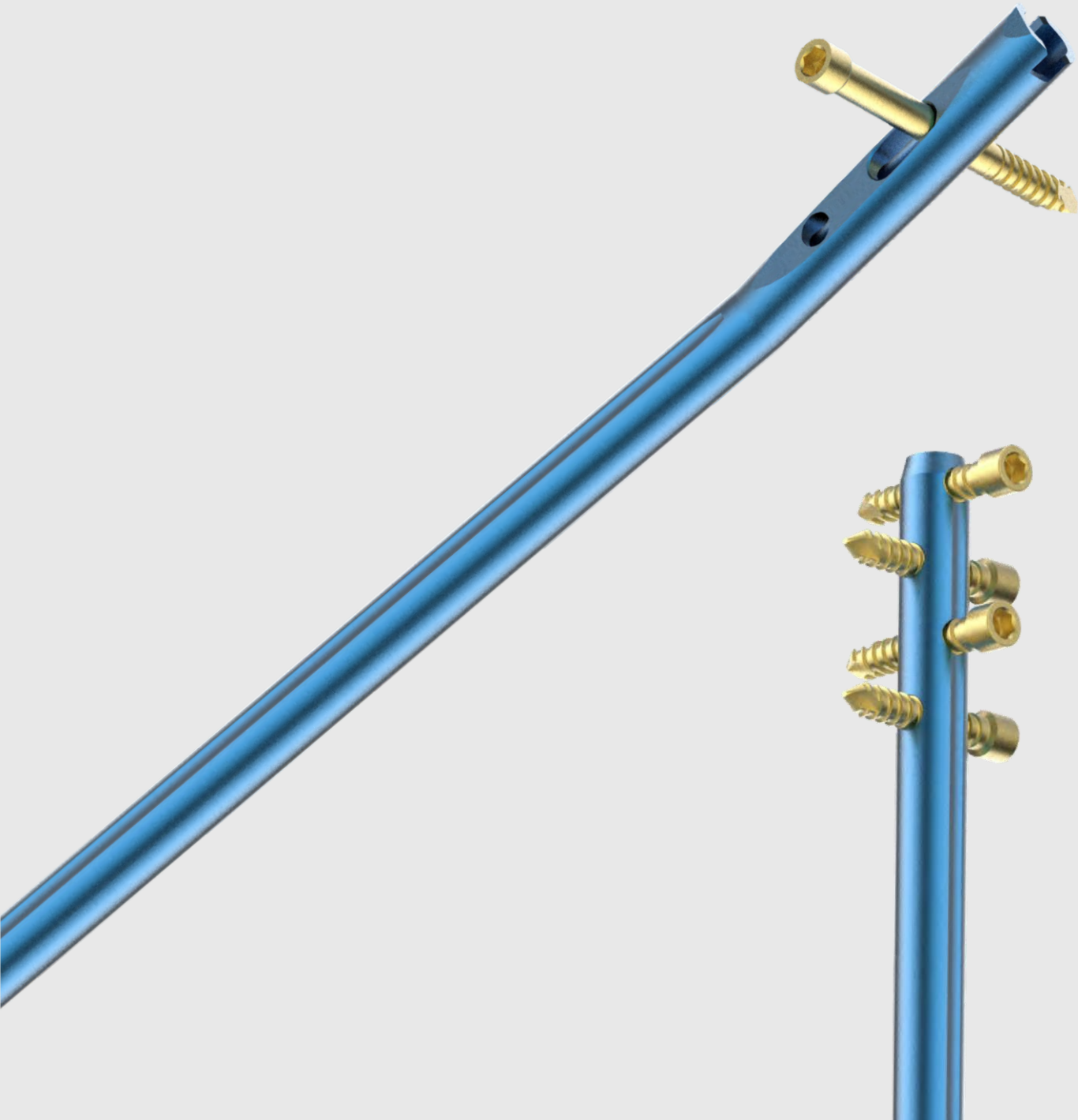


Surgical Technique

Konzept Humerus Nailing System

INTRODUCTION

Humerus nailing system Consists of anatomically pre-contoured Compression Intramedullary humerus nail, Reconstruction Nail & Reconstruction intramedullary humerus nail.



INDICATIONS:

The AUXEIN MEDICAL Humerus Nail System is intended to aid in the alignment and stabilization of humeral fractures which include:

- Diaphyseal fractures of the humeral shaft
- Fractures of the proximal humerus
- Proximal humeral fractures with diaphyseal extension
- Impending pathologic fractures
- Malunions and nonunions



Patient positioning: The patient is positioned in the Beach chair position on a shoulder table. Support the shoulder with the pads. The operating table should be radiolucent in shoulder area. Perform the radiographic imaging of the humeral fracture in AP and lateral view in order to define the fracture type and choose the intramedullary nail diameter. Alternatively the radiographic image of the opposite healthy humerus bone can be used for the same.



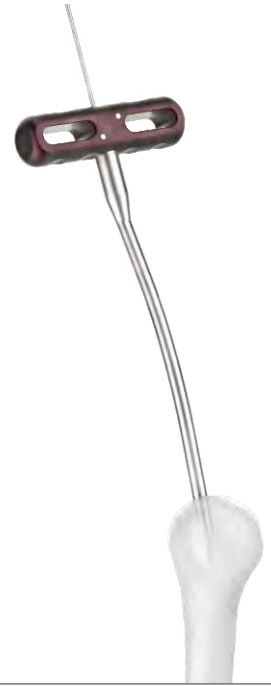
Entry point: An initial incision is made anterolateral to the clavicle-shoulder joint and split the deltoid muscle longitudinally. The antegrade insertion point for the Humeral Nail is located on the extended axis of the central humeral shaft in the lateral view and at the bone-cartilage transition of the humeral head in the AP view and not on the greater tuberosity, otherwise the tendon attachment of the supraspinatus will be affected.



Opening Humeral Head: Insert the Ø2.0mm K wire a bit medial to the greater tuberculum in the axis of intramedullary canal.



Pass the Curved Awl 8.0 (10-1209.00) over the pre-inserted wire and open the medullary canal to a depth of approximately 7cm.



Reaming: After the reaming has been performed, remove the awl and K wire. Now insert the Ø1.8mm Guide rod (10-1021.00) to the required depth as per the selected nail size. In order to aid the easy insertion of nail, ream the medullary canal at successful 0.5mm interval until the diameter reaches 0.5mm larger than the selected nail dia. The proximal part of medullary canal has to be reamed to 11mm dia. with a depth of 7cm.



Measuring Nail length: After the reaming is complete, remove the flexible reamer. Now slide the Nail length measure (10-1207.00) over the guide rod until it sits on the bone. The end of guide rod on the nail length measure indicates the required nail length. Once the length is determined, remove the nail length measure.



Nail and Jig Assembly: Align the tabs on the Humeral target B (**10-1180.00**) to the slots on the compression intramedullary Humeral Nail and fix it in the target B with the help of connecting screw L=101 (**10-1184.00**) using the socket wrench S11 (**10-1199.00**). The holes on the Target B are marked for different locking options as described below:

1. STAT:

There are two STAT marking on the Target B. One is for inserting the locking bolt in proximal round hole of the compression intramedullary Humeral nail while the other one is to insert the locking bolt in the dynamic oblong hole of the compression intramedullary humeral nail in order to provide static locking.

2. COMPRESSION:

The compression hole on Target B is used for inserting the locking bolt in the dynamic oblong hole in the compression intramedullary humeral nail to provide dynamic locking.

3. ANGULAR:

There are two ANGULAR markings on the Target B for inserting locking bolt in the angular configuration in the dynamic oblong hole of the compression intramedullary nail.

4. RECONSTRUCTION:

There are two RECONSTRUCTION markings on the Target B which is used for inserting the locking bolt in the two distal holes of the 150mm Reconstruction Nail.

Unscrew the bolt from the Humeral target B (**10-1180.00**) and attach the Distal Target D (**10-1181.100**) to it and fix it by screwing the bolt on top of the distal target D. Before proceeding with nail inserting procedure, it is important to set the slider on the distal target D so that the holes on the slider are aligned to the distal holes of the compression intramedullary humeral nail.



Insert the Ø3.5/4.5 set blocks (**10-1185.00**) through the two holes in the slider and slide the slider in Distal target D slot until the holes align with the nail and the set blocks sit perfectly into the distal holes of the nail. At this point, fix the slider by tightening the two bolts in slider with the help of 3.5 Hexagonal screwdriver (**10-1198.00**). Remove the set block after final fixation of the slider.



Nail Insertion: In case of cannulated nail, glide the nail over the pre-inserted guide rod and advance it into the bone. Remove the guide rod using Handle guide rod (10-1202.00). For final seating of the nail in intramedullary canal, attach the impactor-extractor (10-1195.00) on top of the humeral target B and apply light blows using Mallet (10-1196.00).



DISTAL LOCKING

After the final seating of nail, insert the protective guide (10-1186.00) & Trocar (10-1190.00) into two holes in the slider. Make a skin incision in line with the trocar and advance both the protection sleeve and trocar through the incision until it sits flush with the bone.

Drilling: In the distal end of Compression Intramedullary humeral nail there are two different locking options depending on the dia. of nail. For Ø6 & Ø7mm Nail, 3.5mm locking bolt will be used in locking at both proximal and the distal end of nail whereas for Ø8 & Ø9mm Nail, 4.5mm locking bolt is used. Following table indicates the Instruments to be used with respect to both 3.5 & 4.5mm Locking bolt:

(Table-1)

Locking Bolt	Instruments
Ø3.5mm Locking bolt	Drill guide 6.5/2.8 (10-1188.00) Ø2.8mm Drill bit (10-1204.00)
Ø4.5mm Locking bolt	Drill guide 6.5/3.5 (10-1187.00) Ø3.5mm Drill bit (10-205.00)



Remove the trocar from the protection sleeve and leave the protective guide in slider of the distal target D. Insert the appropriate drill guide into the protective guide as per the size of locking bolt used. Into the drill guide insert the appropriate drill bit as mentioned in the Table-1 and drill the hole through both the cortex and retrieve the drill bit.



Through the protective guide, insert the screw length measure **(10-1200.00)** across the predrilled hole until it reaches the second cortex. Note down the marking on the screw length measure indicating the required locking bolt length.

Note: While measuring the length make sure that the protective guide sits flush with the bone for correct measurements.



Select the locking bolt of desired dia. and predetermined length. Using 3.5 Hexagonal screwdriver insert the locking bolt into the predrilled hole.

The freehand technique could also be used for distal locking bolt insertion which is described later on in the technique.



PROXIMAL LOCKING

Dynamic Locking: As mentioned in the distal locking, Ø3.5mm locking bolt will be used for locking in Ø6 & Ø7mm Compression intramedullary humeral nail while Ø4.5mm locking bolt will be used for locking in Ø8 & Ø9mm Nail. Hence, the same instruments as mentioned in Table 1 will be followed for locking bolt insertion technique. Insert the protective guide (10-1186.00) along with the trocar (10-1190.00) through the COMPRESSION marked hole in the Humeral Target B (10-1180.00). Make a stab incision and advance both the protective guide and trocar until it sits flush with the bone. Using the trocar mark a point on bone for drilling.



Drilling: Remove the trocar and insert the appropriate drill guide as per the nail being used into the protective guide. Through the drill guide insert the appropriate drill bit and drill the bone under image intensifier. Remove the drill bit and drill guide from protective guide.



Advance the screw length measure **(10-1200.00)** through the protective guide until it reaches the end of hole and note down the readings for the required locking bolt length.



Using the 3.5 Hexagonal screwdriver (**10-1198.00**) insert the appropriate locking into the predrilled hole.



In case of Ø8 & Ø9mm Compression intramedullary humeral nail, the Ø4.5mm Proximal screw can also be used in the dynamic hole. There is a variation in drilling process as described below:

Insert the protective guide through the COMPRESSION marked hole in the Humeral Target B (**10-1180.00**). Through the protective guide insert the Drill guide 6.5/3.5 (**10-1187.00**). Advance the Ø3.5mm Drill bit (**10-1205.00**) through the drill guide and drill the bone under image intensifier to the desired depth of screw insertion. Retrieve back the 3.5mm drill bit and the 6.5/3.5mm drill guide from the protective guide.



Advance the Drill guide 6.5/4.5 (**10-1189.00**) into the protective guide (**10-1186.00**). Now through the drill guide insert the 4.5mm Drill bit (**10-1206.00**) in order to drill and widen the bone in first cortex. The following steps of measuring and screw insertion would be same as described previously.



Static Locking: As mentioned earlier, the $\varnothing 3.5$ mm locking bolt will be used for insertion in $\varnothing 6$ & $\varnothing 7$ mm Nail while $\varnothing 4.5$ mm locking bolt will be used for $\varnothing 8$ & $\varnothing 9$ mm Nail.

Insert the protective guide (**10-1186.00**) along with Trocar (**10-1190.00**) through either of the STAT marked hole of the Humeral Target B (**10-1102.01**).



Make a stab incision on skin and advance both until it sits flush with the bone and mark point for drilling on bone. Remove the Trocar and through the protective guide insert the appropriate drill guide and drill the bone using the corresponding drill bit as per the instrument s previously mentioned in Tabe-1.

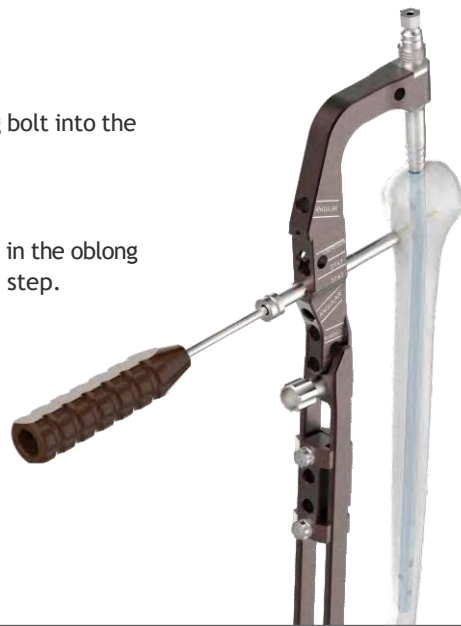


Remove the drill bit and drill guide from the protective guide. Using the screw length measure (**10-1200.00**) note down the marking for the required screw length.



Using the 3.5 Hexagonal screwdriver (**10-1198.00**) insert the locking bolt into the predrilled hole.

In case of Ø8 & Ø9mm Nail, the Ø4.5mm Proximal screw will be inserted in the oblong hole using the same technique as mentioned in the Dynamic Locking step.



Oblique locking: Oblique locking can be achieved through the any of the either ANGULAR marked holes in the Humeral target B (**10-1180.00**). The oblique locking will take place in oblong hole at the proximal end of the nail. Hence, the Ø6 & Ø7mm Nail will accept the 3.5mm locking bolt while the Ø8 & Ø9mm Nail will accept the Ø4.5mm Locking bolt.

Insert the Protective guide (**10-1186.00**) through the either of the ANGULAR marked holes depending on the configuration in which the Locking bolt has to be inserted. Now through the Protective guide insert the Trocar (**10-1190.00**). Make a stab incision in the skin and advance both the trocar and protection sleeve through the Humeral target B holes until it sits flush with the bone.



Remove the trocar and insert the appropriate drill guide followed by insertion of corresponding drill bit as per the Table-1 and drill the bone to desired depth under the image intensifier.



Now using the screw length measure **(10-1200.00)** note down the desired Locking bolt length.



Take the 3.5 Hexagonal screwdriver **(10-1198.00)** for final insertion of the Locking bolt in the predrilled hole.



Jig Removal from the nail: After the final proximal locking has been achieved, the jig has to be detached from the nail. Use the socket wrench S11 **(10-1199.00)** to remove the connecting screw from the nail and separate the jig from the nail.



End cap or Compression screw insertion: There are option for insertion of either End cap or the compression screw at the open end of the nail.

Alternative 1: Compression screw

The compression screw will be used during implementation of dynamic locking. With the help of 3.5 Hexagonal Screwdriver (**10-1198.00**) insert the compression screw from the open end of nail which will cause the reduction of the fracture.



Alternative 2: End Cap

In order to prevent the bone in-growth in the inner threads of the nail, it is important to cover the open end of nail using end cap. The 3.5 Hexagonal screwdriver (**10-1198.00**) will be used to insert the End cap at the open end of nail.



RECONSTRUCTION NAIL

Nail and Jig attachment: The tabs on Humeral target B (**10-1182.01**) is aligned to the slots in Reconstruction or the Reconstruction Intramedullary Humeral nail. Insert the Connecting screw (**10-1183.00**) through the humeral target B into the nail and screwed in using the socket wrench S11 (**10-1199.00**).



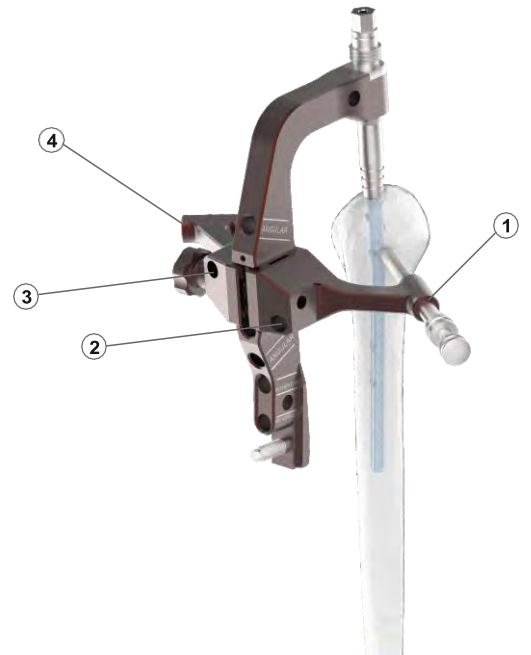
Proximal locking: The Proximal locking technique for both the Reconstruction Nail and Reconstruction intramedullary Humeral Nail are same as described below:

First of all attach the Angular reconstruction Target (**10-1182.00**) to the Humeral target B (**10-1180.00**) as shown in the adjoining figure. Align the holes on humeral target B with the pin on the Angular reconstruction target and fix it in place using the bolt.

As marked in the adjoining figure, there are 4 different holes in the Angular reconstruction target for insertion of all the proximal locking bolt.

The proximal end of the reconstruction as well as the Reconstruction Intramedullary Humeral nail of $\varnothing 6$ & $\varnothing 7$ mm accepts 3.5mm Locking Bolt. Whereas the $\varnothing 8$ & $\varnothing 9$ mm Nail accepts the 4.5mm Locking bolt.

Insert the Protective Guide (**10-1186.00**) into one of these holes along with the Trocar (**10-1190.00**). Make a stab incision on the skin and advance both of them until it sits flush with the bone. Mark a starting point with trocar for drilling and remove the trocar.



Drilling: Insert the appropriate Drill guide into the Protective guide followed by insertion of corresponding drill bit as per the Table-1 and drill the bone to desired depth under image intensifier. After drilling has been performed remove drill bit and the drill guide.



Using Screw Length measure (10-1200.00) note down the desired locking bolt length.



Locking bolt Insertion: Fit the Hex head of the Locking bolt into the 3.5 Hexagonal Screwdriver (10-1198.00) and insert it into the predrilled hole. Repeat the Locking bolt insertion for the remaining holes through the holes in the Angular reconstruction target (10-1182.00) using the above mentioned same technique.



Distal Locking for Reconstruction Nail:

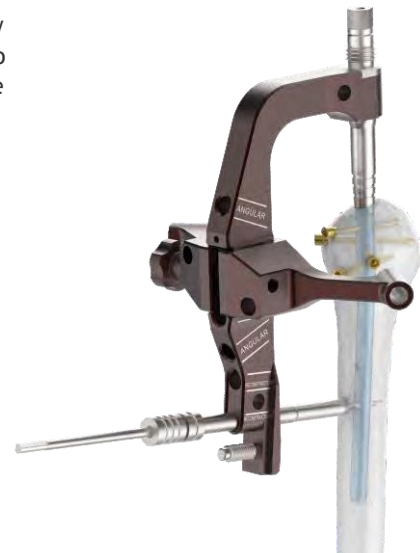
For distal locking in the Reconstruction nail, the holes with RECONSTRUCTION marking on the Humeral Target B (10-1180.00) will be used.

The Distal end of the reconstruction nail of Ø6 & Ø7mm accepts 3.5mm locking bolt whereas the Ø8 & Ø9mm nail accepts 4.5mm locking bolt.

Initiate by inserting both Protective guide (10-1186.00) and Trocar (10-1190.00) through the marked holes. Make a stab incision into the skin and advance both until it sits flush with the bone. Mark a starting point with trocar for drilling and remove the trocar.



Drilling: Insert the appropriate Drill guide into the Protective guide followed by insertion of corresponding drill bit as per the Table-1 and drill the bone to desired depth under image intensifier. After drilling has been performed remove drill bit and the drill guide.



Using Screw Length measure (10-1200.00) note down the desired locking bolt length.



Locking bolt Insertion: Fit the Hex head of the Locking bolt into the 3.5 Hexagonal Screwdriver (10-1198.00) and insert it into the predrilled hole.



Repeat the same steps for insertion of the remaining Locking bolt at distal end of nail.



Distal Locking for Reconstruction Intramedullary humeral nail:

Before performing locking at the distal end, verify the alignment of the holes in nail with the holes in slider in Distal target D (10-1181.00) under the image intensifier.

The Distal end of the Reconstruction Intramedullary Humeral Nail of Ø6 & Ø7mm accepts the 3.5mm locking bolt and the Ø8 & Ø9mm accepts 4.5mm locking bolt.

Insert the Protective guide into one of the slider holes of distal target D (10-1181.00) along with the Trocar (10-1190.00). Make a stab incision on the skin and advance both of them until it sits flush with the bone. Mark a starting point with trocar for drilling and remove the trocar.



Drilling: Insert the appropriate Drill guide into the Protective guide followed by insertion of corresponding drill bit as per the Table-1 and drill the bone to desired depth under image intensifier. After drilling has been performed remove drill bit and the drill guide.



Using Screw Length measure (10-1200.00) note down the desired locking bolt length.



Locking bolt Insertion: Fit the Hex head of the Locking bolt into the 3.5 Hexagonal Screwdriver (10-1198.00) and insert it into the predrilled hole. Repeat the same steps for insertion of the remaining Locking bolt at distal end of nail.



Distal locking of nail using Freehand Technique:

In this technique, to find the entry points for drilling the image intensifier is used. Hence, it is advised to use the power tool for drilling holes in order to prevent the direct contact of surgeon's hand to the X-rays. After marking points, make skin incisions along the markings.

Under Image intensifier place the Target D (10-1191.00) in line to the hole of the nail. After the holes are in alignment, advance the Target D until its teeth sink into the cortex. Through the Target D insert the short Trocar (10-1192.00) until it sits into the cortex and mark a point for drilling and remove the trocar.



Drilling: There will be two different techniques for insertion of 3.5mm Locking bolt and the 4.5mm locking bolt as describe below:

- I) **For 4.5mm locking bolt:** The Ø8 & Ø9mm Nail accepts the 4.5mm locking bolts at the distal end of nail. Firstly, insert the Drill guide short 7/3.5 (10-1193.00) through the Target D (10-1191.00) and through this drill guide insert the Ø3.5mm Drill bit (10-1205.00) and drill across both the cortex.
- II) **For 3.5mm locking bolt:** The Ø6 & Ø7mm accepts the 3.5mm locking bolts at the distal end of nail. Firstly, insert the Drill guide short 7/2.8 (10-1194.00) through the Target D (10-1191.00) and through the drill guide insert the Ø2.8mm Drill bit (10-1204.00) and drill across both the cortex. Finally, remove both drill guide and drill bit.



Insert the screw length measure (**10-1200.00**) through the Target D and measure the required locking bolt length. Remove the screw length measure.



Using the 3.5 Hexagonal Screwdriver (**10-1198.00**) insert the locking bolt into the predrilled hole.
Repeat the same steps for the second distal locking bolt insertion.



Nail Extraction: Firstly remove the end cap or compression screw using the 3.5 Hexagonal screwdriver (10-1198.00) followed by attaching the connector M7/M16 (**10-1197.00**) using the socket wrench S11 (**10-1199.00**)



Remove all the locking bolts from the nail using 3.5Hexagonal screwdriver (**10-1198.00**). Attach the impactor-extractor (**10-1195.00**) to the connector M7/M16 (**10-1197.00**) and remove the nail from medullary canal by slight backward taps using the Mallet (**10-1196.00**).



Intramedullary Cannulated Humerus Nail

	Stainless Steel	Titanium	Dia x Length
Ø6mm	6082-6.0-180	TI-6082-6.0-180	Ø6mm x 180mm
	6082-6.0-200	TI-6082-6.0-200	Ø6mm x 200mm
	6082-6.0-220	TI-6082-6.0-220	Ø6mm x 220mm
	6082-6.0-240	TI-6082-6.0-240	Ø6mm x 240mm
	6082-6.0-260	TI-6082-6.0-260	Ø6mm x 260mm
	6082-6.0-280	TI-6082-6.0-280	Ø6mm x 280mm
	6082-6.0-300	TI-6082-6.0-300	Ø6mm x 300mm
	6082-6.0-320	TI-6082-6.0-320	Ø6mm x 320mm
Ø7mm	6082-7.0-180	TI-6082-7.0-180	Ø7mm x 180mm
	6082-7.0-200	TI-6082-7.0-200	Ø7mm x 200mm
	6082-7.0-220	TI-6082-7.0-220	Ø7mm x 220mm
	6082-7.0-240	TI-6082-7.0-240	Ø7mm x 240mm
	6082-7.0-260	TI-6082-7.0-260	Ø7mm x 260mm
	6082-7.0-280	TI-6082-7.0-280	Ø7mm x 280mm
	6082-7.0-300	TI-6082-7.0-300	Ø7mm x 300mm
	6082-7.0-320	TI-6082-7.0-320	Ø7mm x 320mm
Ø8mm	6082-8.0-180	TI-6082-8.0-180	Ø8mm x 180mm
	6082-8.0-200	TI-6082-8.0-200	Ø8mm x 200mm
	6082-8.0-220	TI-6082-8.0-220	Ø8mm x 220mm
	6082-8.0-240	TI-6082-8.0-240	Ø8mm x 240mm
	6082-8.0-260	TI-6082-8.0-260	Ø8mm x 260mm
	6082-8.0-280	TI-6082-8.0-280	Ø8mm x 280mm
	6082-8.0-300	TI-6082-8.0-300	Ø8mm x 300mm
	6082-8.0-320	TI-6082-8.0-320	Ø8mm x 320mm
Ø9mm	6082-9.0-180	TI-6082-9.0-180	Ø9mm x 180mm
	6082-9.0-200	TI-6082-9.0-200	Ø9mm x 200mm
	6082-9.0-220	TI-6082-9.0-220	Ø9mm x 220mm
	6082-9.0-240	TI-6082-9.0-240	Ø9mm x 240mm
	6082-9.0-260	TI-6082-9.0-260	Ø9mm x 260mm
	6082-9.0-280	TI-6082-9.0-280	Ø9mm x 280mm
	6082-9.0-300	TI-6082-9.0-300	Ø9mm x 300mm
	6082-9.0-320	TI-6082-9.0-320	Ø9mm x 320mm



End Cap For Intramedullary Humerus Nail

Stainless Steel	Titanium
6083.100	TI-6083.100



Compression Screw For Intramedullary Humerus Nail

Stainless Steel	Titanium
1219.000	TI-1219.000



4.5mm Locking Bolt For Humerus Nail

Length(mm)	Stainless Steel	Titanium
20	6001.020	TI-6001.020
24	6001.022	TI-6001.022
26	6001.024	TI-6001.024
28	6001.026	TI-6001.026
30	6001.028	TI-6001.028
35	6001.030	TI-6001.030
40	6001.035	TI-6001.035
	6001.040	TI-6001.040
45	6001.045	TI-6001.045
50	6001.050	TI-6001.050
55	6001.055	TI-6001.055
60	6001.060	TI-6001.060
65	6001.065	TI-6001.065
70	6001.070	TI-6001.070



Ø4.5mm Proximal Screw

Length(mm)	Stainless Steel	Titanium
25	1221.025	TI-1221.025
30	1221.030	TI-1221.030
35	1221.035	TI-1221.035
40	1221.040	TI-1221.040
45	1221.045	TI-1221.045
50	1221.050	TI-1221.050
55	1221.055	TI-1221.055
60	1221.060	TI-1221.060
65	1221.065	TI-1221.065
70	1221.070	TI-1221.070



Reconstruction Nail, Cannulated

Stainless Steel	Titanium	Dia x Length
6092-6.0-150	TI-6092-6.0-150	Ø6mm x 150mm
6092-7.0-150	TI-6092-7.0-150	Ø7mm x 150mm
6092-8.0-150	TI-6092-8.0-150	Ø8mm x 150mm
6092-9.0-150	TI-6092-9.0-150	Ø9mm x 150mm



Reconstruction Cannulated Intramedullary Humerus Nail

	Stainless Steel	Titanium	Dia x Length
Ø6mm	6092-6.0-200	TI-6092-6.0-200	Ø6mm x 200mm
	6092-6.0-220	TI-6092-6.0-220	Ø6mm x 220mm
	6092-6.0-240	TI-6092-6.0-240	Ø6mm x 240mm
	6092-6.0-260	TI-6092-6.0-260	Ø6mm x 260mm
	6092-6.0-280	TI-6092-6.0-280	Ø6mm x 280mm
	6092-6.0-300	TI-6092-6.0-300	Ø6mm x 300mm
	6092-6.0-320	TI-6092-6.0-320	Ø6mm x 320mm
Ø7mm	6092-7.0-200	TI-6092-7.0-200	Ø7mm x 200mm
	6092-7.0-220	TI-6092-7.0-220	Ø7mm x 220mm
	6092-7.0-240	TI-6092-7.0-240	Ø7mm x 240mm
	6092-7.0-260	TI-6092-7.0-260	Ø7mm x 260mm
	6092-7.0-280	TI-6092-7.0-280	Ø7mm x 280mm
	6092-7.0-300	TI-6092-7.0-300	Ø7mm x 300mm
	6092-7.0-320	TI-6092-7.0-320	Ø7mm x 320mm
Ø8mm	6092-8.0-200	TI-6092-8.0-200	Ø8mm x 200mm
	6092-8.0-220	TI-6092-8.0-220	Ø8mm x 220mm
	6092-8.0-240	TI-6092-8.0-240	Ø8mm x 240mm
	6092-8.0-260	TI-6092-8.0-260	Ø8mm x 260mm
	6092-8.0-280	TI-6092-8.0-280	Ø8mm x 280mm
	6092-8.0-300	TI-6092-8.0-300	Ø8mm x 300mm
	6092-8.0-320	TI-6092-8.0-320	Ø8mm x 320mm
Ø9mm	6092-9.0-200	TI-6092-9.0-200	Ø9mm x 200mm
	6092-9.0-220	TI-6092-9.0-220	Ø9mm x 220mm
	6092-9.0-240	TI-6092-9.0-240	Ø9mm x 240mm
	6092-9.0-260	TI-6092-9.0-260	Ø9mm x 260mm
	6092-9.0-280	TI-6092-9.0-280	Ø9mm x 280mm
	6092-9.0-300	TI-6092-9.0-300	Ø9mm x 300mm
	6092-9.0-320	TI-6092-9.0-320	Ø9mm x 320mm



End Cap For Reconstruction Cannulated Intramedullary Nail

Stainless Steel	Titanium
6084.00	TI-6084.00



Ø3.5mm Locking Bolt For Humerus Nail

Length(mm)	Stainless Steel	Titanium
20	1222.020	TI-1222.020
22	1222.022	TI-1222.022
24	1222.024	TI-1222.024
26	1222.026	TI-1222.026
28	1222.028	TI-1222.028
30	1222.030	TI-1222.030
35	1222.035	TI-1222.035
40	1222.040	TI-1222.040
45	1222.045	TI-1222.045
50	1222.050	TI-1222.050
55	1222.055	TI-1222.055
60	1222.060	TI-1222.060
65	1222.065	TI-1222.065
70	1222.070	TI-1222.070



Ø4.5mm Locking Bolt For Humerus Nail

Length(mm)	Stainless Steel	Titanium
20	6001.020	TI-6001.020
22	6001.022	TI-6001.022
24	6001.024	TI-6001.024
26	6001.026	TI-6001.026
28	6001.028	TI-6001.028
30	6001.030	TI-6001.030
35	6001.035	TI-6001.035
40	6001.040	TI-6001.040
45	6001.045	TI-6001.045
50	6001.050	TI-6001.050
55	6001.055	TI-6001.055
60	6001.060	TI-6001.060
65	6001.065	TI-6001.065
70	6001.070	TI-6001.070



10-1180-00 Humeral Target B for Konzept Humerus Nail



10-1181-00 Distal Target D for Konzept Humerus Nail



10-1182-00 Angular Reconstruction Target for Konzept Humerus Nail



10-1183-00 Connecting Screw M7x1spec. Length 95mm, for Konzept Humerus Nail



10-1184-00 Connecting Screw M7x1spec. Length 101mm, for Konzept Humerus Nail



10-1185-00 Set Block Ø3.5/4.5mm for Konzept Humerus Nail



10-1186-00 Protective Guide Ø6.5/9mm for Konzept Humerus Nail



10-1187-00 Drill Guide Ø6.5/3.5mm for Konzept Humerus Nail



10-1188-00 Drill Guide Ø6.5/2.8mm for Konzept Humerus Nail



10-1189-00 Drill Guide Ø6.5/4.5mm for Konzept Humerus Nail



10-1190-00 Trocar Ø6.5mm for Konzept Humerus Nail



10-1191-00 Target D for Konzept Humerus Nail



10-1192-00 Short Trocar Ø7mm for Konzept Humerus Nail



10-1193-00 Drill Guide Short Ø7/3.5mm for Konzept Humerus Nail



10-1194-00 Drill Guide Ø7/2.8mm for Konzept Humerus Nail



10-1195-00 Impactor-Extractor Rod for Konzept Humerus Nail



10-1196-00 Mallet for Konzept Humerus Nail



10-1197-00 Connector M7/M16 for Konzept Humerus Nail



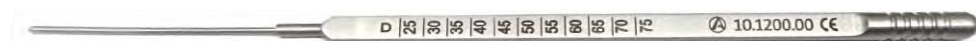
10-1198-00 Screwdriver, Hex 3.5mm, for Konzept Humerus Nail



10-1199-00 Socket Wrench, Hex 11mm for Konzept Humerus Nail



10-1200-00 Screw Length Measuring Device for Konzept Humerus Nail



10-1201-00 Guide Rod Ø1.8mm x Length 500mm for Konzept Humerus Nail



10-1202-00 Handle Guide Rod for Konzept Humerus Nail



10-1203-00 Teflon Pipe Guide for Konzept Humerus Nail



10-1204-00

Drill with Scale $\varnothing 2.8\text{mm}$ x Length 240mm, for Konzept Humerus Nail



10-1205-00

Drill with Scale $\varnothing 3.5\text{mm}$ x Length 240mm, for Konzept Humerus Nail



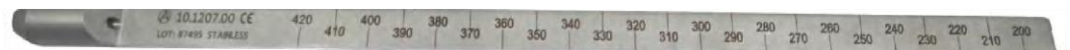
10-1206-00

Drill with Scale $\varnothing 4.5\text{mm}$ x Length 240mm, for Konzept Humerus Nail



10-1207-00

Nail Length Measuring Device for Konzept Humerus Nail



10-1208-00

Insertion Target $\varnothing 9.0\text{mm}$ for Konzept Humerus Nail



10-1209-00

Curved Awl $\varnothing 8.0\text{mm}$ for Konzept Humerus Nail



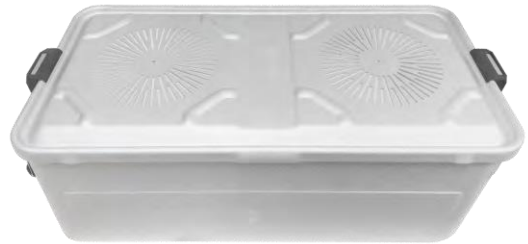
10-1210-00

Instrument Trays for Konzept Humerus Nailing Instrument Set

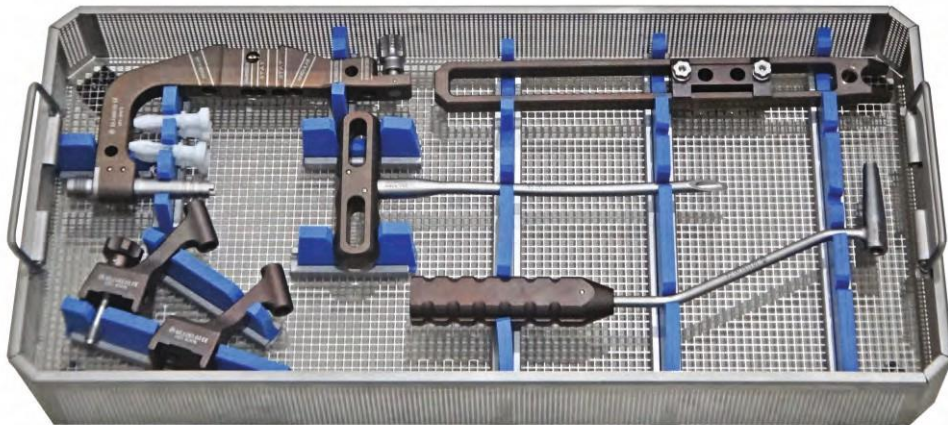
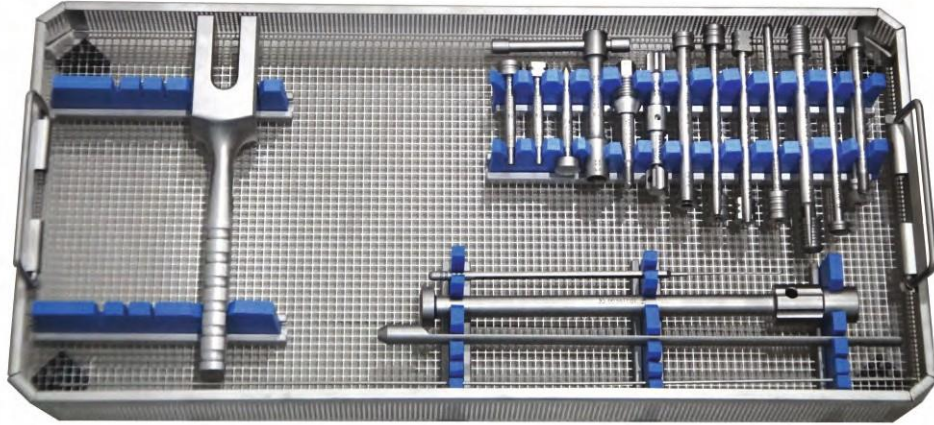


7-106-01

Aluminium Sterilization Container, 560mm x 270mm x 150mm



40-5020-000 Konzept Humerus Nailing Instrument Set



40-5020-000 Konzept Humerus Nailing Instrument Set

Code	Set Consisting of	Units
10-1180-00	Humeral Target B for Konzept Humerus Nail	1
10-1181-00	Distal Target D for Konzept Humerus Nail	1
10-1182-00	Angular Reconstruction Target for Konzept Humerus Nail	2
10-1183-00	Connecting Screw M7x1spec. Length 95mm, for Konzept Humerus Nail	1
10-1184-00	Connecting Screw M7x1spec. Length 101mm, for Konzept Humerus Nail	1
10-1185-00	Set Block Ø3.5/4.5mm for Konzept Humerus Nail	2
10-1186-00	Protective Guide Ø6.5/9mm for Konzept Humerus Nail	2
10-1187-00	Drill Guide Ø6.5/3.5mm for Konzept Humerus Nail	2
10-1188-00	Drill Guide Ø6.5/2.8mm for Konzept Humerus Nail	2
10-1189-00	Drill Guide Ø6.5/4.5mm for Konzept Humerus Nail	1
10-1190-00	Trocar Ø6.5mm for Konzept Humerus Nail	1
10-1191-00	Target D for Konzept Humerus Nail	1
10-1192-00	Short Trocar Ø7mm for Konzept Humerus Nail	1
10-1193-00	Drill Guide Short Ø7/3.5mm for Konzept Humerus Nail	1
10-1194-00	Drill Guide Ø7/2.8mm for Konzept Humerus Nail	1
10-1195-00	Impactor-Extractor Rod for Konzept Humerus Nail	1
10-1196-00	Mallet for Konzept Humerus Nail	1
10-1197-00	Connector M7/M16 for Konzept Humerus Nail	1
10-1198-00	Screwdriver, Hex 3.5mm, for Konzept Humerus Nail	1
10-1199-00	Socket Wrench, Hex 11mm for Konzept Humerus Nail	1
10-1200-00	Screw Length Measuring Device for Konzept Humerus Nail	1
10-1201-00	Guide Rod Ø1.8mm x Length 500mm for Konzept Humerus Nail	1
10-1202-00	Handle Guide Rod for Konzept Humerus Nail	1
10-1203-00	Teflon Pipe Guide for Konzept Humerus Nail	1
10-1204-00	Drill with Scale Ø2.8mm x Length 240mm, for Konzept Humerus Nail	2
10-1205-00	Drill with Scale Ø3.5mm x Length 240mm, for Konzept Humerus Nail	2
10-1206-00	Drill with Scale Ø4.5mm x Length 240mm, for Konzept Humerus Nail	1
10-1207-00	Nail Length Measuring Device for Konzept Humerus Nail	1
10-1208-00	Insertion Target Ø9.0mm for Konzept Humerus Nail	4
10-1209-00	Curved Awl Ø8.0mm for Konzept Humerus Nail	1
10-1210-00	Instrument Trays for Konzept Humerus Nailing Instrument Set	2
7-106-01	Aluminium Sterilization Container, 560mm x 270mm x 150mm	1



Surgical Technique

Clavicle Plate

3.5mm Wise-Lock Superior Anterior Clavicle Plates.

The 3.5mm Wise-lock Clavicle Plates combine locking screw technology with conventional plating techniques and include the following:

3.5mm Wise-lock Superior Anterior Clavicle Plates (6, 7 and 8 holes)

3.5mm Wise-lock Superior Anterior Clavicle Plates with lateral extension (3, 4, 5, 6, 7 and 8 holes)

Plates feature Combi holes that allow fixation with wise-lock screws in the threaded section for angular stability, and

cortical screws in the dynamic compression unit (DCU) section for compression.

Plates feature Combi holes that allow

fixation with wise-lock screws in the

threaded section for angular stability, and

cortical screws in the dynamic compression unit (DCU) section for compression.

Features

- Precontoured plate for anatomical shape
- Left and right plates
- Notches in the plate allow additional plate contouring
- Limited-contact shaft profile
- Tapered tip for submuscular plate insertion
- Available sterile-packed

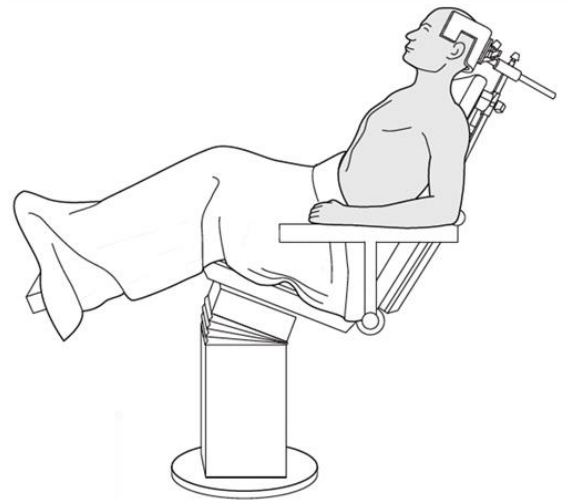
Indications

The 3.5 mm Wise-Lock Clavicle Plate System is indicated for fixation of fractures, malunions, nonunions and osteotomies of the clavicle.



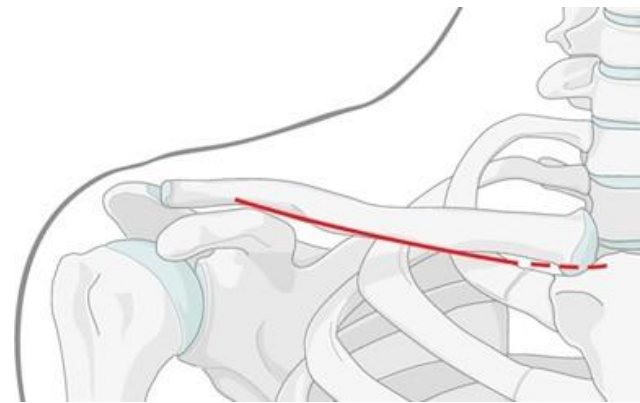
Position patient

A beach-chair or supine position on a radiolucent operating table is recommended to provide appropriate access to the clavicle. AP and lordotic visualization of the clavicle with fluoroscopy is recommended. A small roll or folded towel placed between the scapulae allows retraction of the shoulders and assists with reduction. The head of the patient should be turned away from the operative side and may be supported with a head rest.



Approach

The horizontal incision is placed over the superior or inferior clavicle, depending on the stabilization method. The medial, intermediate, and lateral supraclavicular nerves travel deep to the platysma then typically pierce this muscle and the superficial fascia at the level of the clavicle. Subcutaneous dissection is performed carefully as it may permit the identification of the perforating supraclavicular sensory nerves. Subsequent division of the platysma is also performed carefully as the supraclavicular nerves may still be deep to the platysma depending on the cephalad level of the dissection. Division of the platysma will expose the clavicle - periosteum at the deltotrapezial fascia and the pectoralis origin.



Do not strip any comminuted fragments.

Reduce

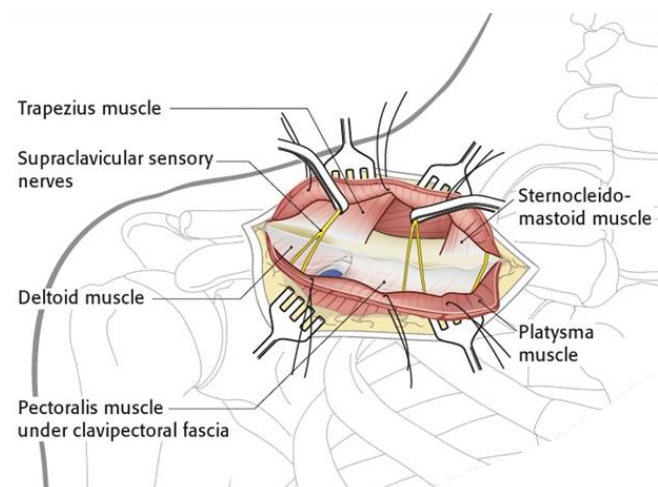
After fracture exposure, distract the two main fragments and restore the length of the clavicle. If the bone ends are angled or oblique, reduction with a pointed or serrated reduction forceps is recommended. Normal length, axis angulation and rotation should be restored. Any large comminuted fragments should also be reduced and temporarily held with small pointed bone clamps or K-wires. Plan temporary fixation to not interfere with placement of definitive fixation.

K-wires can be placed through the distal end of the plate to assist with temporary maintenance of the reduction, and for plate placement.

Additional options for maintaining the reduction include:

- Independent lag screws
- Lag screws through the plate

Note: To estimate the amount of clavicular length to restore, clinically measure the distance between the acromioclavicular joint and the sternoclavicular joint on the contralateral side.



Determine plate length and bend plate

Select a plate length appropriate for the fracture.

Due to varying patient anatomy, the plate may not be perfectly anatomical and slight plate bending may be necessary. Using bending irons, contour the plate as needed. For an optimum fit, the plate can be bent at each notch in the plane of the shaft.

Note: The medial end of the plate should be twisted anteriorly to avoid disruption of the origin of the sternocleidomastoid muscle.

Insert plate

Position the plate on the reduced bone, and attach it temporarily with the plate holding forceps, push / pull reduction device or a 3.5 mm cortical screw. After plate insertion, check alignment of the bone using fluoroscopy.

Note: This Wise-lock plate is precontoured to fit the clavicle. 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.

Verify screw placement

Since the direction of the Wise-Lock screw depends on the contour of the plate, final screw position may be verified with K-wires before insertion. This becomes important when the plate has been manually contoured, applied near the acromioclavicular joint, or for unusual anatomy.

Verify K-wire placement under image intensification to determine if final screw placement will be acceptable.

Important: The K-wire position represents the final position of the Wise-Lock screw. Confirm that the K-wire does not enter the joint.

Insert screws

Determine the combination of screws to be used for fixation. If a combination of Wise-lock and cortical screws will be used, cortical screws should be inserted first to ensure that the plate has appropriate bone contact.

Note: To secure the plate to the clavicle prior to Wise-lock screw insertion, it is recommended to pull the plate to the bone using a cortical screw.

It is necessary to avoid overpenetration of the inferior clavicle, due to the close proximity of the subclavian artery and brachial plexus.

Fixation with 3.5 mm cortical screw

Use the 2.5 mm drill bit through the 3.5 mm drill guide to predrill the bone. For the neutral position, press the drill guide down in the nonthreaded end of the hole. To obtain compression, place the drill guide at the end of the nonthreaded hole away from the fracture (do not apply downward pressure on the spring-loaded tip).



Measure for screw length using the depth gauge. Select and insert the appropriate length 3.5 mm cortical screw using a hexagonal screwdriver.



Wise-lock screw insertion

Notes:

The direction of the Wise-Lock screws is predetermined based on normal anatomy. If manual contouring is necessary, verify new screw trajectories using the K-wire placement. The use of image intensification is recommended.

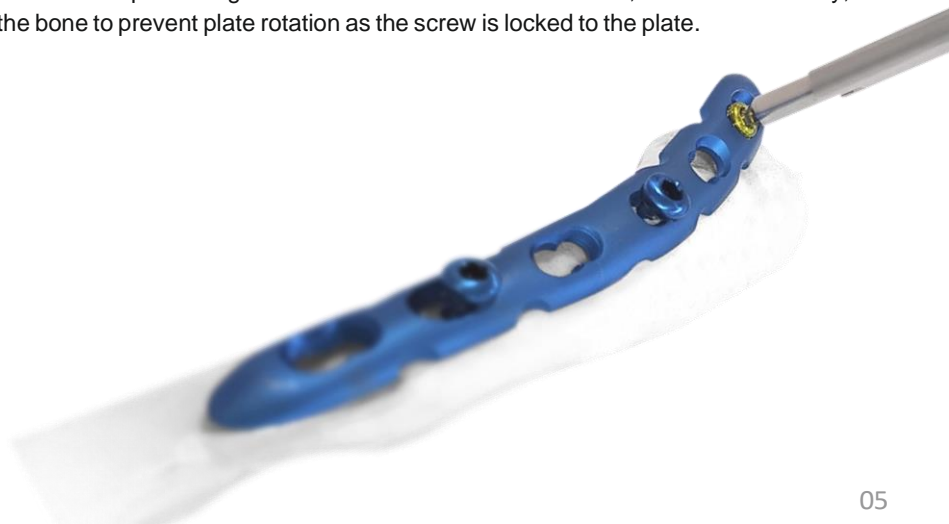
If a Wise-Lock screw will be used as the first screw, be sure the fracture is reduced and the plate is held securely to the bone. This prevents plate rotation as the screw is locked to the plate.

Fixation with 3.5 mm Wise-Lock screw

Insert the 2.8 mm threaded drill guide into a 3.5 mm Wise-Lock hole until fully seated. Use the 2.8 mm drill bit to drill to the desired depth. Remove the 2.8 mm threaded drill guide. Use the depth gauge to determine screw length.



Insert the Wise-Lock screw under power, using the 1.5 Nm torque limiting attachment and the screwdriver shaft, or insert it manually, using the screwdriver. Hold the plate securely on the bone to prevent plate rotation as the screw is locked to the plate.

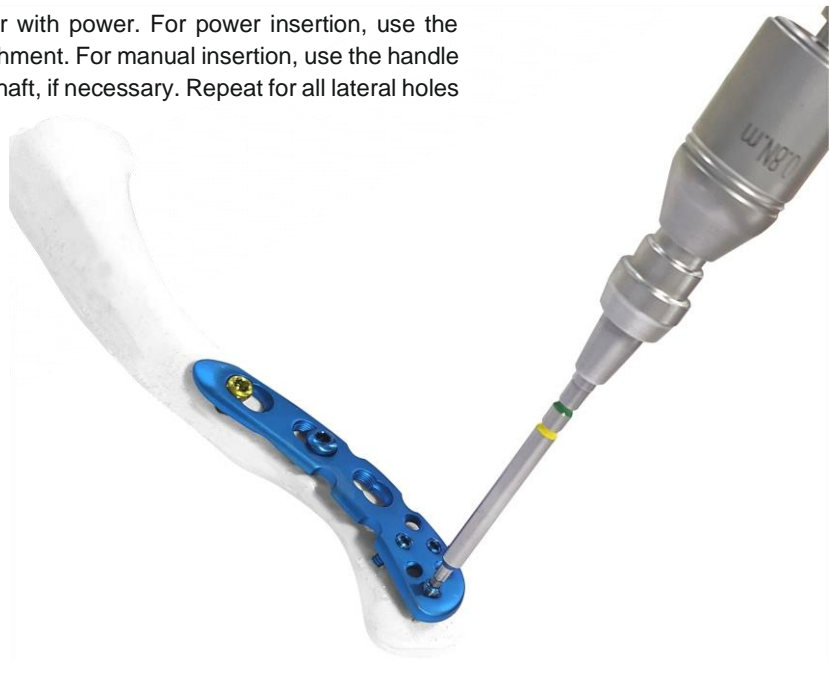


Fixation with 2.7 mm Wise-Lock screws - lateral

Screw the 2.0 mm threaded drill guide into a 2.7 mm Wise-Lock hole until fully seated. Use the 2.0 mm drill bit to drill to the desired depth. Remove the 2.0 mm threaded drill guide. Use the depth gauge to determine screw length..



The 2.7 mm Wise-Lock screw can be inserted manually or with power. For power insertion, use the screwdriver shaft attached to the 0.8Nm torque limiting attachment. For manual insertion, use the handle with quick coupling. Use the holding sleeve for screwdriver shaft, if necessary. Repeat for all lateral holes to be used



Confirm reduction and fixation

Assess the final reduction and fixation, by both direct visualization and image intensification. Confirm full range of motion and stability of the fixation with the shoulder. AP and lordotic fluoroscopic visualization should confirm reduction and appropriate positioning of the plate and screws.



3.5mm Wise-Lock Superior Anterior Clavicle Plate



Holes	Left Direction		Right Direction	
	Stainless Steel	Titanium	Stainless Steel	Titanium
6	526.006L	TI-526.006L	526.006R	TI-526.006R
7	526.007L	TI-526.007L	526.007R	TI-526.007R
8	526.008L	TI-526.008L	526.008R	TI-526.008R

2.7/3.5mm Wise-Lock Superior Anterior Clavicle Plate with Lateral Extension



Holes	Left Direction		Right Direction	
	Stainless Steel	Titanium	Stainless Steel	Titanium
3	527.003L	TI-527.003L	527.003R	TI-527.003R
4	527.004L	TI-527.004L	527.004R	TI-527.004R
5	527.005L	TI-527.005L	527.005R	TI-527.005R
6	527.006L	TI-527.006L	527.006R	TI-527.006R
7	527.007L	TI-527.007L	527.007R	TI-527.007R
8	527.008L	TI-527.008L	527.008R	TI-527.008R

3443-37 Depth Gauge, measuring range upto 60mm



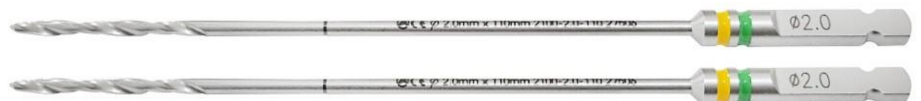
3445-2.5 Screw Driver, Hex 2.5mm, Self-Retaining (for Screw Removal)



3992-035 Allen Key for Dill Bit Stopper Ø3.0mm



2100-2.0-110 Drill Bit with Quick Coupling, Ø2.0mm x Length 110mm



2100-2.5-112 Drill Bit with Quick Coupling, Ø2.5mm x Length 112mm



2100-3.5-112 Drill Bit with Quick Coupling, Ø3.5mm x Length 112mm



2103-2.8-165

Drill Bit with Quick Coupling with Stopper, Ø2.8mm x Length 165mm



2104-27

Bone Tap Quick Coupling for Wise Lock Screws, Ø2.7mm



2104-02

Bone Tap Quick Coupling for Cortical Screws, Ø3.5mm



2104-04

Bone Tap, Quick Coupling for Cancellous Screws, Ø4.0mm



3400-01

Countersink for Ø3.5/4.0mm Screws, Quick Coupling



3408-01

Hexagonal Screw Driver Shaft - 2.5mm Tip, Quick Coupling



3408-03

Hexagonal Screw Driver Shaft - 2.0mm Tip, Quick Coupling



2186-2.5

HSS Drill Bit, Ø2.5, Metal



2106-1.2

Guide Sleeve for Ø1.2mm K. Wires



3443-05

Depth Gauge, measuring range upto 50mm, for Ø2.4mm/2.7mm Screws



3443-39

Trephine



BT-SF-06

Bending Template, Small



BT-SF-08

Bending Template, Medium



BT-SF-10

Bending Template, Large



3402-000

T-Handle with Quick Coupling



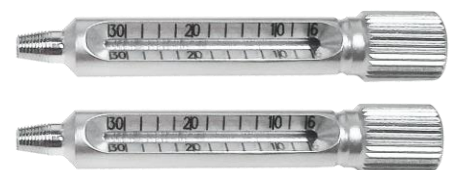
1472-054

Quick Coupling Shaft



TDG-2.7

Threaded Drill Guide, Ø2.7mm (For Drill Bit 2.0mm)



3441-18

Threaded Drill Guide, Ø3.5mm (For Drill Bit 2.8mm)



3420-01

Drill Sleeve Insert, $\varnothing 3.5/2.5\text{mm}$



1472-036

Drill Guide 2.0mm



1472-044

Double Drill Guide, $\varnothing 2.0/2.7\text{mm}$



1472-046

Self Centering Double Drill Guide, $\varnothing 2.5/3.5\text{mm}$



3441-16

Drill Guide for Neutral and Loaded Position, $\varnothing 3.5\text{mm}$



1472-066

Hohmann Retractor, 6.5mm



1472-068

Hohmann Retractor, 8.5mm



2146-018

Hohmann Retractor, 15.5mm



2149-1012

Periosteal Elevator, Straight, 12mm



3406-02

Hexagonal Screw Driver-2.0mm Tip



3406-02S

Screw Holding sleeve for 2.0mm Tip Screwdriver



3406-03

Hexagonal Screw Driver-2.5mm Tip



3406-03S Screw Holding sleeve for 2.5mm Tip Screwdriver



3409-01L Small Bending Iron, Left



3409-01R Small Bending Iron, Right



2107-1180 Reduction Forcep, Pointed, Ratchet Lock, 180mm



2106-1160 Reduction Forcep, Serrated Jaws, Speed Lock, 160mm



2106-190 Self Centering Bone Holding Forcep, Speed Lock, 190mm



2150-1006S

Periosteal Elevator with Silicon Handle, Curved, 6mm



TQ-2.0

Torque Limiting Attachment, 0.8Nm



TQ-2.5

Torque Limiting Attachment, 1.5Nm



1472-064

Toque Screw Driver Handle



GW-1.2-230

Guide Wire with Threaded Trocar Tip, Ø1.2mm x Thread Length 10mm x Length 230mm



3415-000

Screw Holding Forcep For 3.5mm Wise-Lock Small Fragment System



ST-007NW

Screw Caddy For 3.5mm Wise-Lock Small Fragment System



7-050-03

Instrument Trays For 3.5mm Wise-Lock Small Fragment Instrument Set

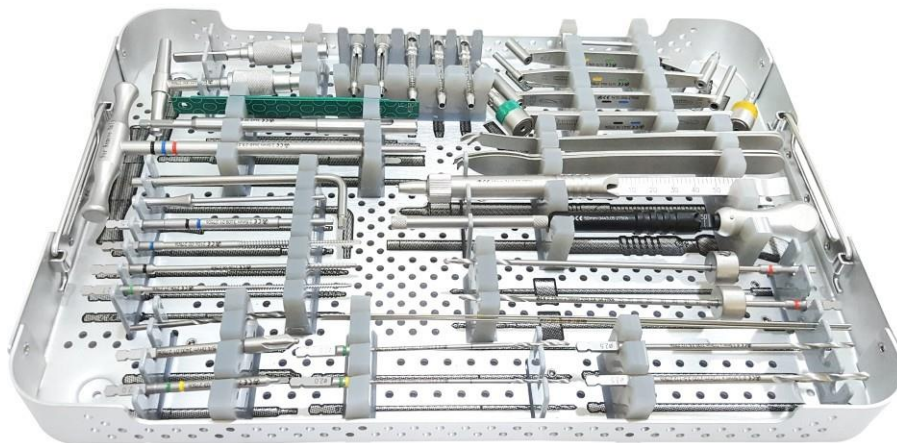
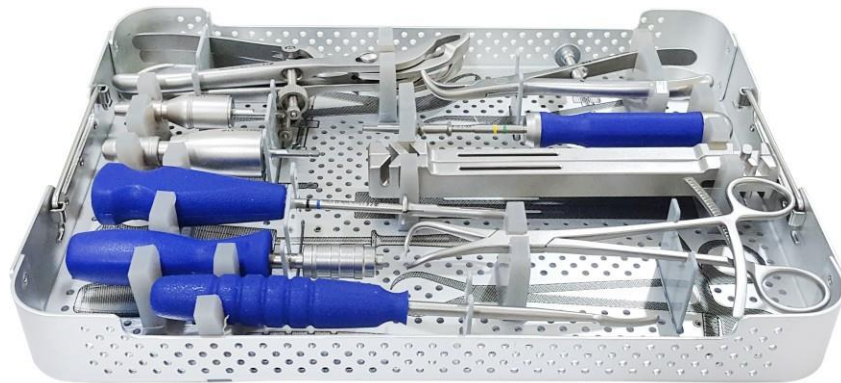


IC-2310-WL

Container for 3.5mm Wise-Lock Small Fragment Instrument Set



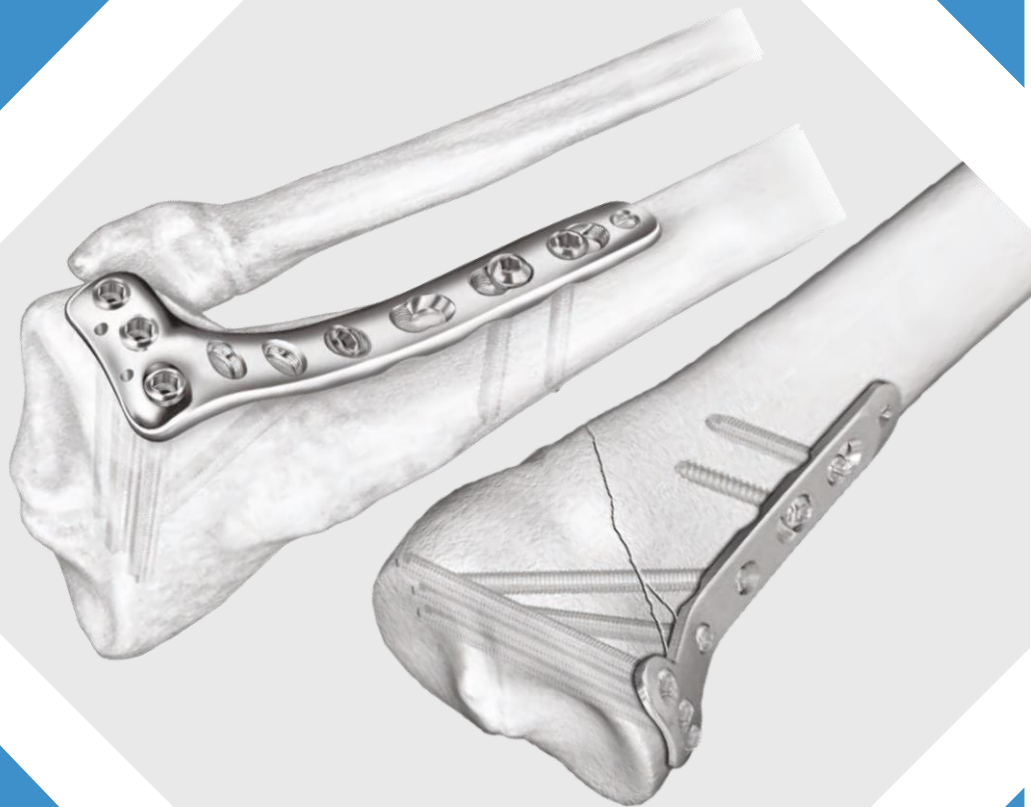
2302-000 Small Fragment Wise-Lock Instrument Set



2302-000 Small Fragment Wise-Lock Instrument Set

Codes	Set Consisting of:	Units
3443-37	Depth Gauge, measuring range upto 60mm	1
3445-2.5	Screw Driver, Hex 2.5mm, Self-Retaining (for Screw Removal)	1
3992-035	Allen Key for Dill Bit Stopper Ø3.0mm	1
2100-2.0-110	Drill Bit with Quick Coupling, Ø2.0mm x Length 110mm	2
2100-2.5-112	Drill Bit with Quick Coupling, Ø2.5mm x Length 112mm	1
2100-3.5-112	Drill Bit with Quick Coupling, Ø3.5mm x Length 112mm	1
2103-2.8-165	Drill Bit with Quick Coupling with Stopper, Ø2.8mm x Length 165mm	2
2104-27	Bone Tap Quick Coupling for Wise Lock Screws, Ø2.7mm	1
2104-02	Bone Tap Quick Coupling for Cortical Screws, Ø3.5mm	1
2104-04	Bone Tap, Quick Coupling for Cancellous Screws, Ø4.0mm	1
3400-01	Countersink for Ø3.5/4.0mm Screws, Quick Coupling	1
3408-01	Hexagonal Screw Driver Shaft - 2.5mm Tip, Quick Coupling	1
3408-03	Hexagonal Screw Driver Shaft - 2.0mm Tip, Quick Coupling	1
2186-2.5	HSS Drill Bit, Ø2.5, Metal	1
2106-1.2	Guide Sleeve for Ø1.2mm K. Wires	1
3443-05	Depth Gauge, measuring range upto 50mm, for Ø2.4mm/2.7mm Screws	1
3443-39	Trephine	1
BT-SF-06	Bending Template, Small	1
BT-SF-08	Bending Template, Medium	1
BT-SF-10	Bending Template, Large	1
3402-000	T-Handle with Quick Coupling	1
1472-054	Quick Coupling Shaft	1
TDG-2.7	Threaded Drill Guide, Ø2.7mm (For Drill Bit 2.0mm)	2
3441-18	Threaded Drill Guide, Ø3.5mm (For Drill Bit 2.8mm)	3
3420-01	Drill Sleeve Insert, Ø3.5/2.5mm	1
1472-036	Drill Guide 2.0mm	1
1472-044	Double Drill Guide, Ø2.0/2.7mm	1
1472-046	Self Centering Double Drill Guide, Ø2.5/3.5mm	1
3441-16	Drill Guide for Neutral and Loaded Position, Ø3.5mm	1
1472-066	Hohmann Retractor, 6.5mm	1
1472-068	Hohmann Retractor, 8.5mm	1
2146-018	Hohmann Retractor, 15.5mm	2
2149-1012	Periosteal Elevator, Straight, 12mm	1
3406-02	Hexagonal Screw Driver-2.0mm Tip	1
3406-02S	Screw Holding sleeve for 2.0mm Tip Screwdriver	1
3406-03	Hexagonal Screw Driver-2.5mm Tip	1
3406-03S	Screw Holding sleeve for 2.5mm Tip screwdriver	1
3409-01L	Small Bending Iron, Left	1
3409-01R	Small Bending Iron, Right	1
2107-1180	Reduction Forcep, Pointed, Ratchet Lock, 180mm	1
2106-1160	Reduction Forcep, Serrated Jaws, Speed Lock, 160mm	1

Codes	Set Consisting of:	Units
2106-190	Self Centering Bone Holding Forcep, Speed Lock, 190mm	2
2150-1006S	Periosteal Elevator with Silicon Handle, Curved, 6mm	1
TQ-2.0	Torque Limiting Attachment, 0.8Nm	1
TQ-2.5	Torque Limiting Attachment, 1.5Nm	1
1472-064	Toque Screw Driver Handle	1
GW-1.2-230	Guide Wire with Threaded Trocar Tip, Ø1.2mm x Thread Length 10mm x Length 230mm	3
3415-000	Screw Hoding Forcep For 3.5mm Wise-Lock Small Fragment System	1
ST-007NW	Screw Caddy For 3.5mm Wise-Lock Small Fragment System	1
7-050-03	Instrument Trays For 3.5mm Wise-Lock Small Fragment Instrument Set	2
IC-2310-WL	Container for 3.5mm Wise-Lock Small Fragment Instrument Set	1



Surgical Technique

5.0mm Wise-Lock Large Fragment System

General Indications

Wise-Lock Implants are intended for temporary fixation, correction or stabilization of bones in various anatomical regions.

Specific Indications

4.5/5.0mm Wise-Lock Medial Proximal Tibia Plate

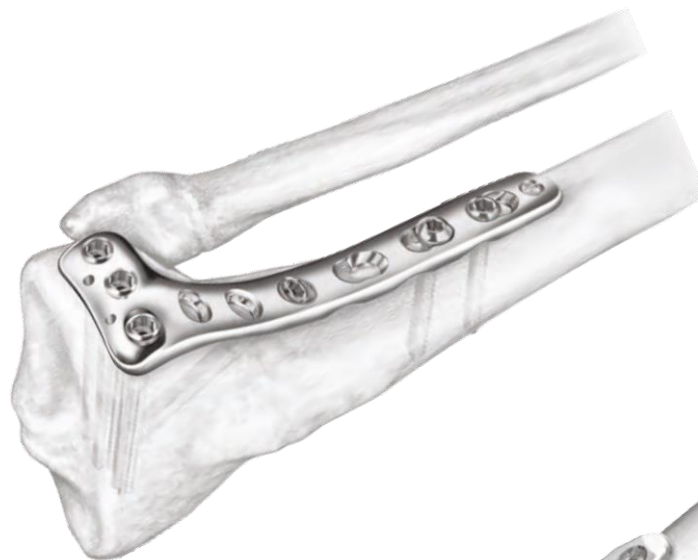
- The plate is intended for complex fractures of Proximal tibia



4.5/5.0mm Wise-Lock Proximal Tibia Plate

The Auxein 4.5 mm Wise-Lock Proximal Tibia Plate is intended for treatment of osteopenic bone, tibial osteotomies, nonunions, malunions and fractures of the proximal tibia including:

- Simple, comminuted fractures
- Lateral wedge fractures
- Depression medial wedge fractures
- Bicondylar combination of lateral wedge and depression fractures
- Periprosthetic fractures
- Proximal fractures with associated shaft fractures



4.5/5.0mm Wise-Lock Distal Femur Plate

This plate is indicated for stabilization of fractures of distal femur including:

- Distal shaft fractures
- Supracondylar fractures
- Intra-articular fractures
- Periprosthetic fractures



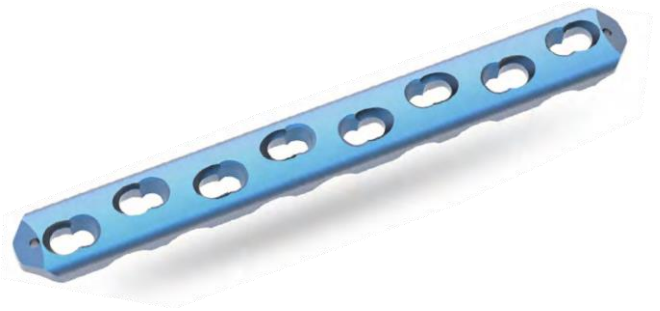
4.5/5.0mm Wise-Lock Narrow Dynamic Compression Plate with LC under cuts

This plate is indicated for fixation of various long bones, such as the humerus, femur and tibia and for use in fixation of peri-prosthetic fractures, osteopenic bone and fixation of non-unions or malunions in adult patients.



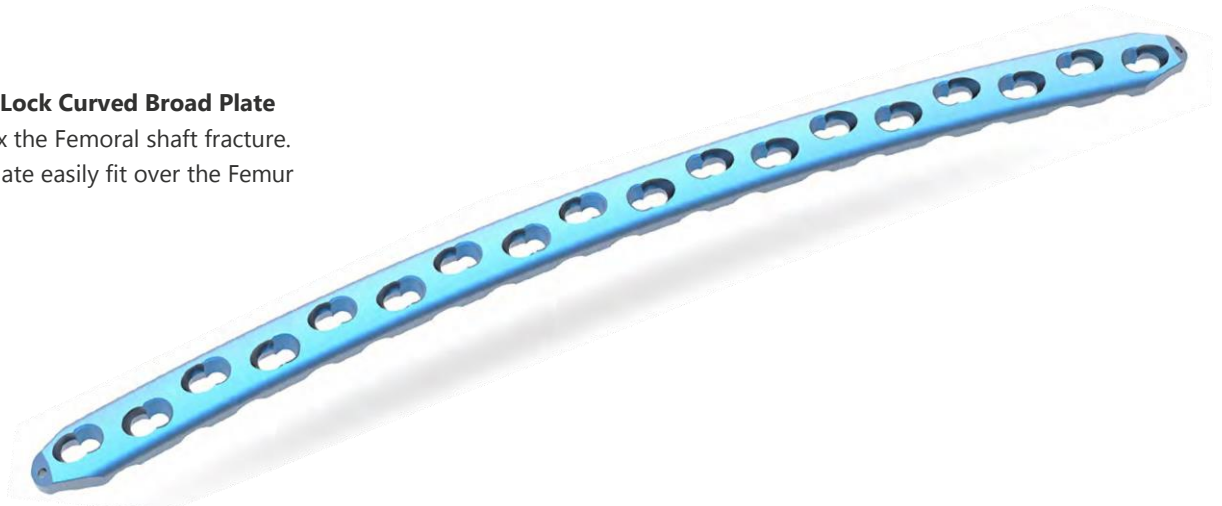
4.5/5.0mm Wise-Lock Broad Dynamic Compression Plate with LC under cuts

It is indicated for fixation of various long bones, such as the humerus, femur and tibia and for use in fixation of peri-prosthetic fractures, osteopenic bone and fixation of non-unions or malunions in adult patients.



4.5/5.0mm Wise-Lock Curved Broad Plate

It is Indicated to fix the Femoral shaft fracture.
The curve in the plate easily fit over the Femur



Fixation Principles

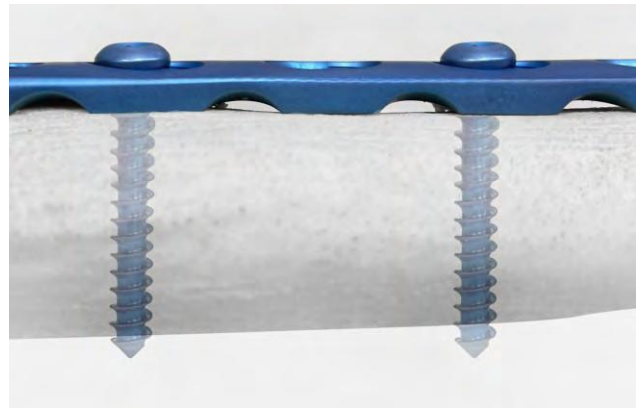
The following points distinguish treatment using locking screw technology from conventional plating techniques:

- It enables fracture treatment using compression plating with conventional cortical or cancellous bone screws
- Wise-Lock plate can also be used as an internal fixator and permits stable bridging over shattered zones
- The Wise-Lock system permits the combination of conventional and locking screws
- Unicortical locking screw permits better vascularity

Note: The Wise-Lock system applies to many different plate types and is therefore suitable for a large number of fracture types. For that reason, this technique guide does not deal with any specific fracture type.

Bicortical screw fixation

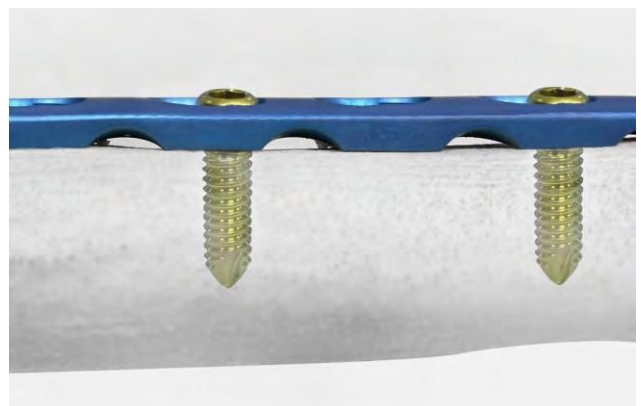
Bicortical screw fixation has long been the traditional method of compressing a plate to the bone where friction between the plate and the bone maintains stability. Screw stability and load transfer are accomplished at two points along the screw: the near and far cortices.



Unicortical screw fixation

Unicortical locking screws provide stability and load transfer only at the near cortex due to the threaded connection between the plate and the screw. Screw stability and load transfer are accomplished at two points along the screw: the screwhead and near cortex. Because the screw is locked to the plate, fixation does not rely solely on the pullout strength of the screw or on maintaining friction between the plate and the bone.

- a. Bicortical screws require two (2) cortices to achieve stability.
- b. Unicortical screws utilize the Wise-Lock screw and the near cortex to achieve stability.

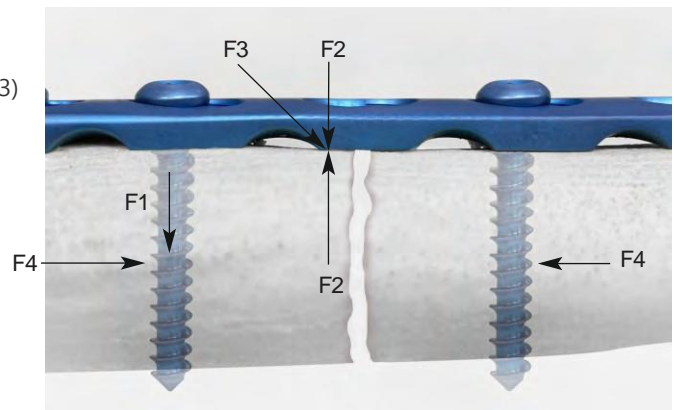


The following examples show the biomechanical features of conventional plating techniques, locked or bridge plating techniques, and a combination of both.

Conventional plating

Absolute stability

The tensile force (F1) originating from tightening the screws presses the plate onto the bone (F2). The developing friction (F3) between the plate and the bone leads to stable plate fixation. To ensure absolute stability, the friction resistance must be higher than the axial forces (F4) arising during rehabilitation.



Anatomic contouring of the plate

The aim of internal fixation is anatomic reduction, particularly in articular fractures. Therefore, the plate must be contoured to the shape of the bone.

Lag screw

Interfragmentary compression is accomplished by using a lag screw. This is particularly important in intra-articular fractures which require a precise reduction of the joint surfaces. Lag screws can be angled in the plate hole, allowing placement of the screw perpendicular to the fracture line.

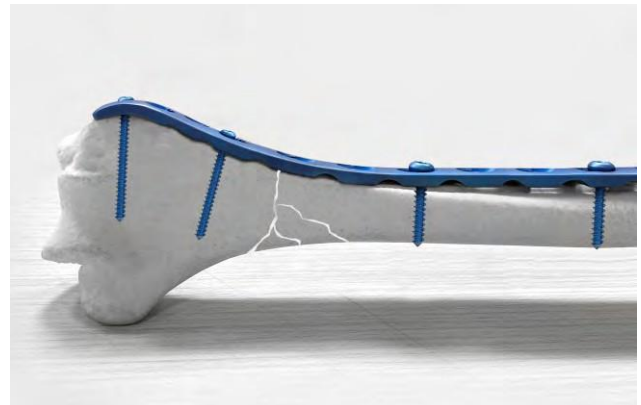
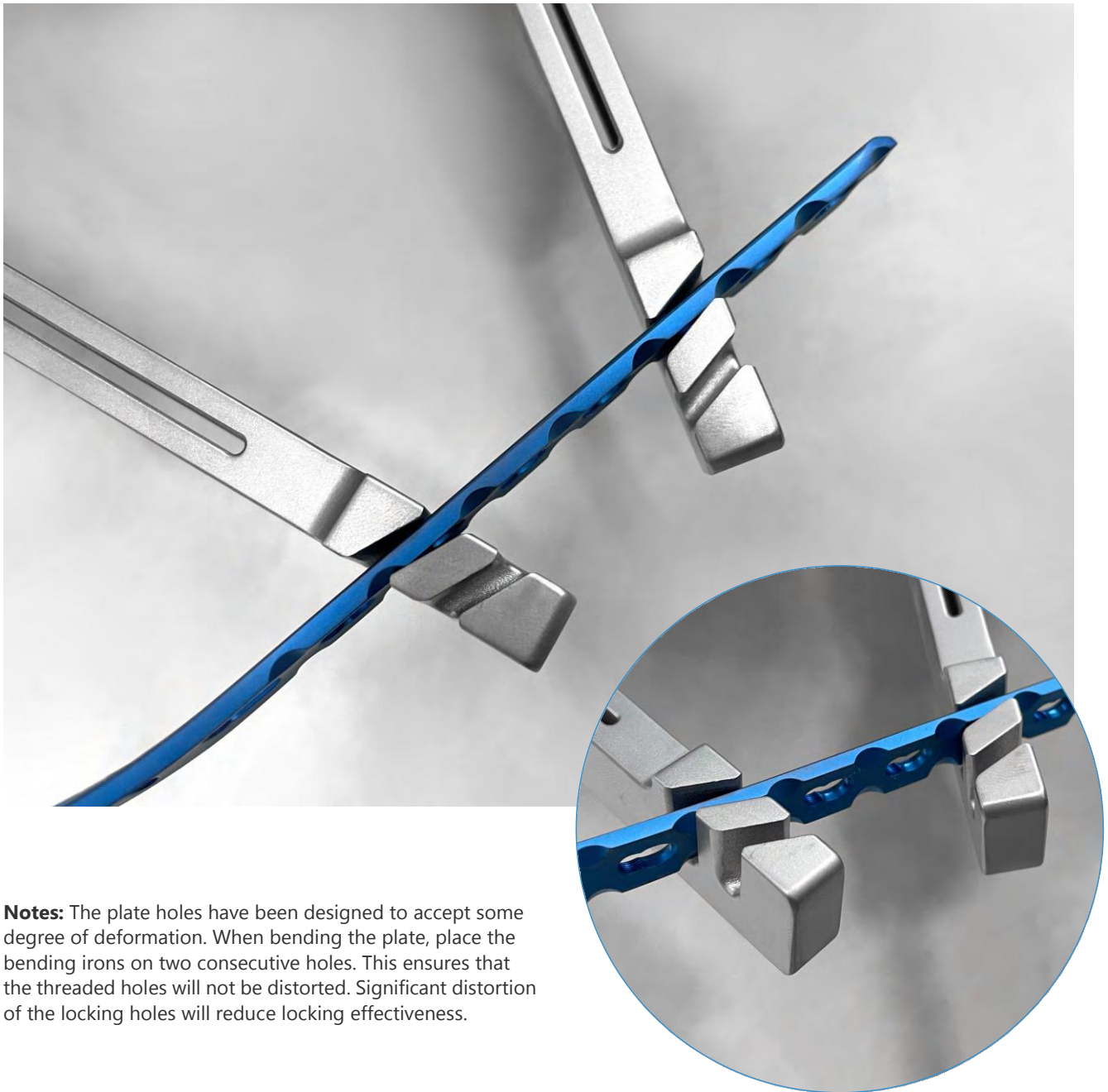


Plate selection

The plates are available in various lengths. If necessary, use a bending template to determine plate length.

Contouring

Use the bending instruments to contour the Wise-Lock plate to the anatomy.



Notes: The plate holes have been designed to accept some degree of deformation. When bending the plate, place the bending irons on two consecutive holes. This ensures that the threaded holes will not be distorted. Significant distortion of the locking holes will reduce locking effectiveness.

Screw Insertion

Determine whether standard 4.5 mm cortical screws, 6.5 mm cancellous screws or 5.0 mm Wise-Lock screws will be used for fixation. A combination of all may be used.

Note: If a combination of cortical, cancellous and Wise-Lock screws is used, a standard screw should be used first to pull the plate to the bone.

Warning: If a Wise-Lock screw is used first, care should be taken to ensure that the plate is held securely to the bone to avoid spinning of the plate about the bone.

Insertion of a cortical or cancellous bone screw

Use the 4.5 mm universal drill guide for an eccentric (compression) or neutral (buttress) insertion of cortical screws.

Neutral insertion of a standard screw

When pressing the universal drill guide into the DCU portion of the Wise-Lock plate, it will center itself and allow neutral predrilling.



Neutral position

Dynamic compression, eccentric insertion of a cortical screw

To drill a hole for dynamic compression, place the universal drill guide eccentrically at the edge of the DCU portion of the Wise-Lock plate hole, without applying pressure. Tightening of the cortical screws will result in dynamic compression.



Dynamic compression

5.0mm Wise-Lock Large Fragment System

Drill a hole through the drill guide using a 3.2mm Drill bit.



Use a depth gauge to measure the required screw length.



Select the Screw of appropriate length as per measurement and insert it using the Screwdriver.



Insertion of 5.0 mm Wise-Lock screws

Reminder: The Wise-Lock screw is not a lag screw. Use standard screws when requiring a precise anatomical reduction (e.g., joint surfaces) or interfragmentary compression. Before inserting the first Wise-Lock screw, perform anatomical reduction and fix the fracture with lag screws, if necessary. After the insertion of Wise-Lock screws, an anatomical reduction will no longer be possible without loosening the Wise-Lock screw.

Screw the 4.3 mm threaded drill guide into an Wise-Lock plate hole until fully seated.



Note: Since the direction of a Wise-Lock screw is determined by plate design, final screw position may be verified with a K-wire prior to insertion. This becomes especially important when the plate has been contoured or applied in metaphyseal regions around joint surfaces.

Warning: Do not try to bend the plate using the threaded drill guide because damage may occur to the plate hole threads.

5.0mm Wise-Lock Large Fragment System



Use the 4.3 mm drill bit to drill the desired depth.



Remove the threaded drill guide and use the depth gauge to determine screw length.

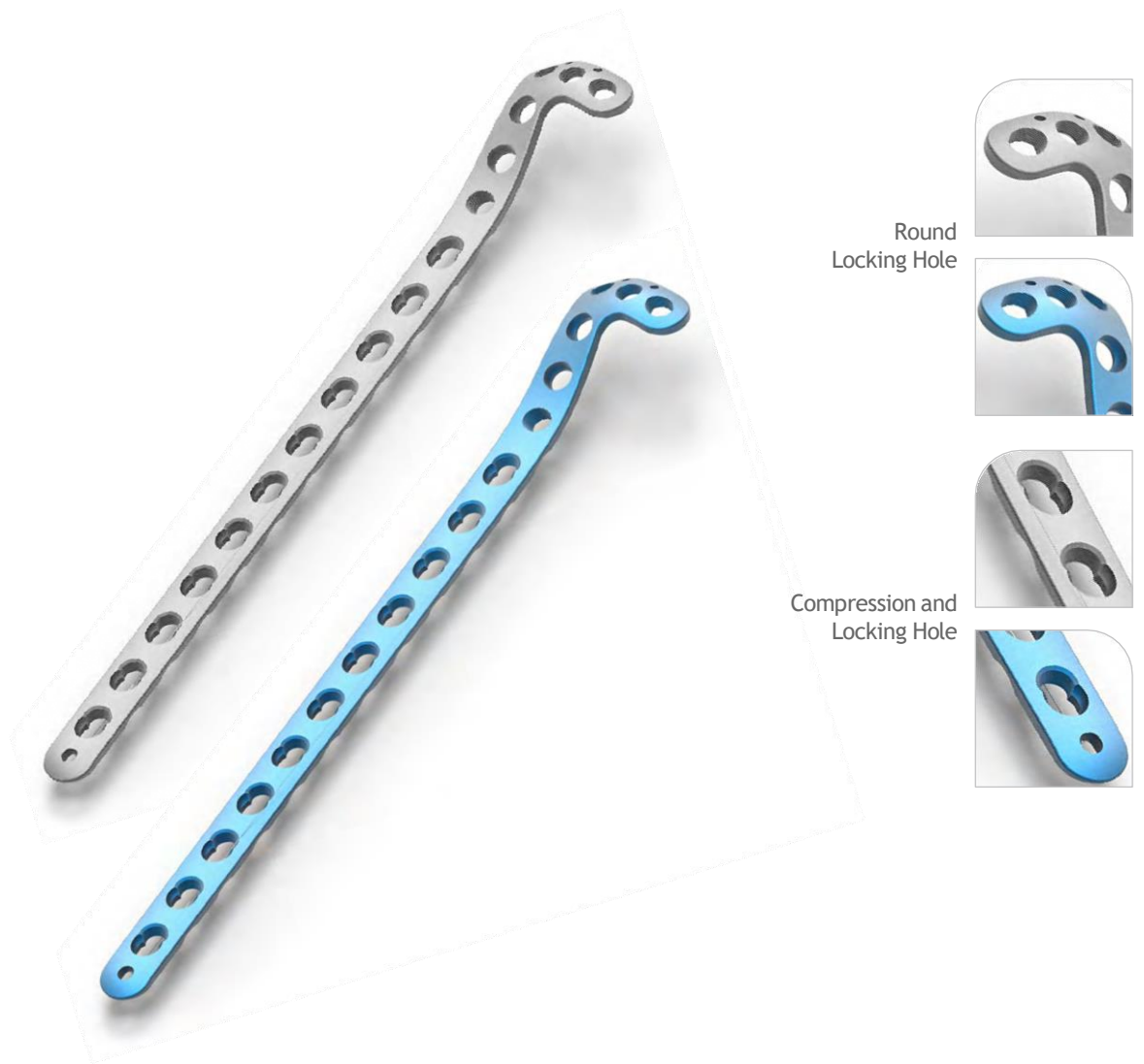
Insert the Wise-Lock screw under power using a 4.0Nm torque limiting attachment and screwdriver shaft.

Note: Recheck each Wise-Lock screw before closing to verify that the screws are securely locked to the plate. Screwheads must be flush with the plate in the locked position before they can be considered fully seated.

Warning: Always use a torque limiting attachment (TLA) when using power to insert Wise-Lock screws.

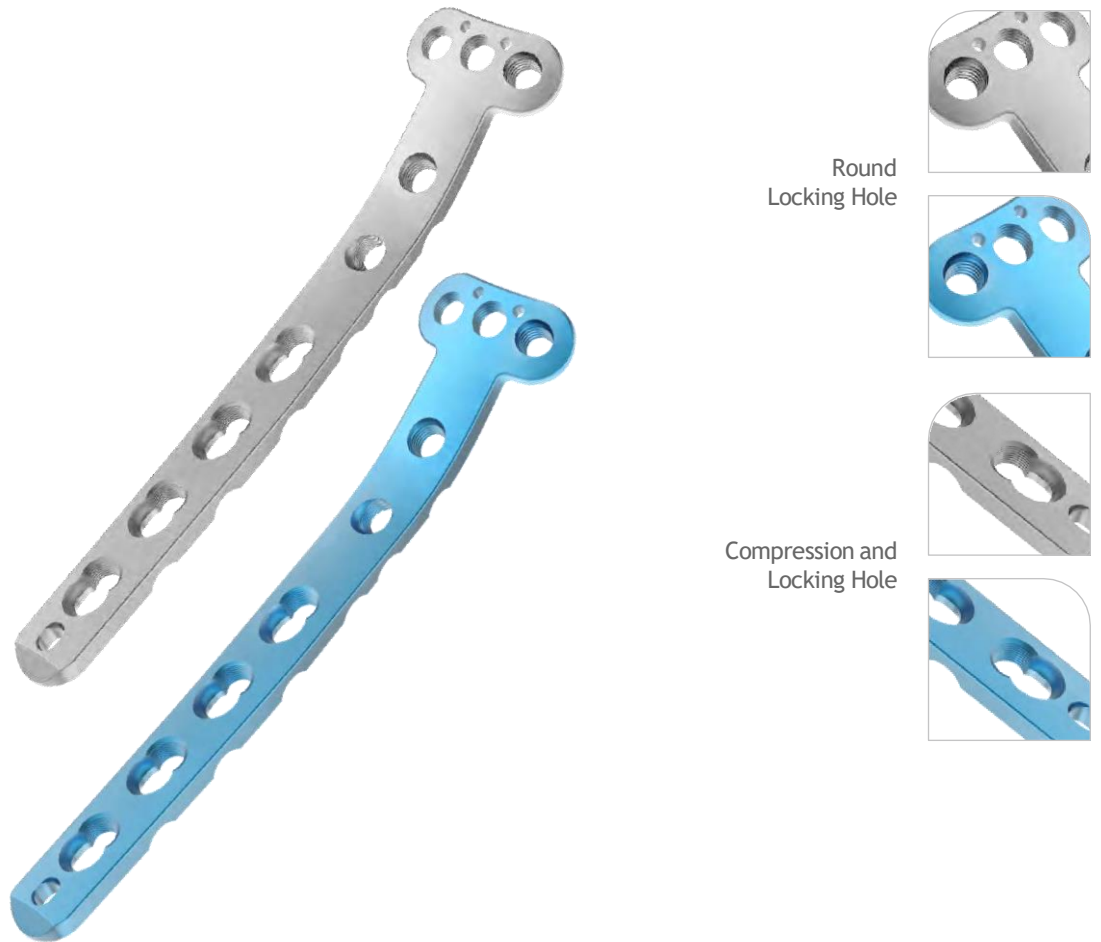


4.5/5.0mm Wise-Lock Proximal Tibia Plate



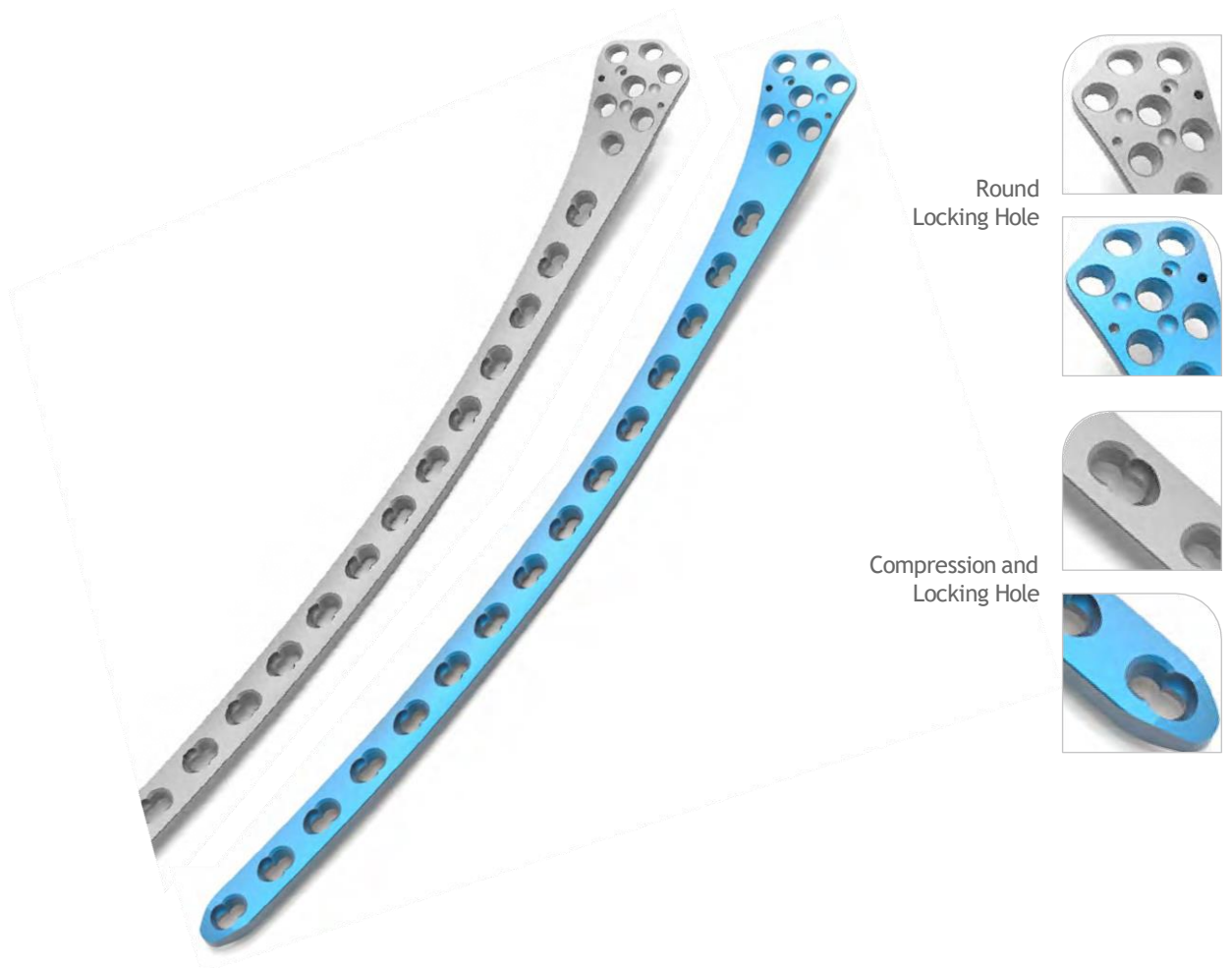
Holes	Left Direction		Right Direction	
	Stainless Steel	Titanium	Stainless Steel	Titanium
4	749.104L	TI-749.104L	749.104R	TI-749.104R
6	749.106L	TI-749.106L	749.106R	TI-749.106R
8	749.108L	TI-749.108L	749.108R	TI-749.108R
10	749.110L	TI-749.110L	749.110R	TI-749.110R
12	749.112L	TI-749.112L	749.112R	TI-749.112R
14	749.114L	TI-749.114L	749.114R	TI-749.114R

4.5/5.0mm Wise-Lock Medial Proximal Tibia Plate



Holes	Left Direction		Right Direction	
	Stainless Steel	Titanium	Stainless Steel	Titanium
4	747.204L	TI-747.204L	747.204R	TI-747.204R
6	747.206L	TI-747.206L	747.206R	TI-747.206R
8	747.208L	TI-747.208L	747.208R	TI-747.208R
10	747.210L	TI-747.210L	747.210R	TI-747.210R
12	747.212L	TI-747.212L	747.212R	TI-747.212R
14	747.214L	TI-747.214L	747.214R	TI-747.214R
16	747.216L	TI-747.216L	747.216R	TI-747.216R

4.5/5.0mm Wise-Lock Distal Femur Plate

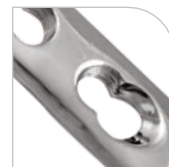


Holes	Left Direction		Right Direction	
	Stainless Steel	Titanium	Stainless Steel	Titanium
5	748.105L	TI-748.105L	748.105R	TI-748.105R
7	748.107L	TI-748.107L	748.107R	TI-748.107R
9	748.109L	TI-748.109L	748.109R	TI-748.109R
11	748.111L	TI-748.111L	748.111R	TI-748.111R
13	748.113L	TI-748.113L	748.113R	TI-748.113R
15	748.115L	TI-748.115L	748.115R	TI-748.115R

4.5/5.0mm Wise-Lock Narrow Dynamic Compression Plate with LC under cuts



Compression and Locking Hole



Holes	Stainless Steel	Titanium
2	723.202	TI-723.202
3	723.203	TI-723.203
4	723.204	TI-723.204
5	723.205	TI-723.205
6	723.206	TI-723.206
7	723.207	TI-723.207
8	723.208	TI-723.208
9	723.209	TI-723.209
10	723.210	TI-723.210
11	723.211	TI-723.211
12	723.212	TI-723.212
14	723.214	TI-723.214
16	723.216	TI-723.216
18	723.218	TI-723.218
20	723.220	TI-723.220
22	723.222	TI-723.222
24	723.224	TI-723.224

4.5/5.0mm Wise-Lock Broad Dynamic Compression Plate with LC under cuts

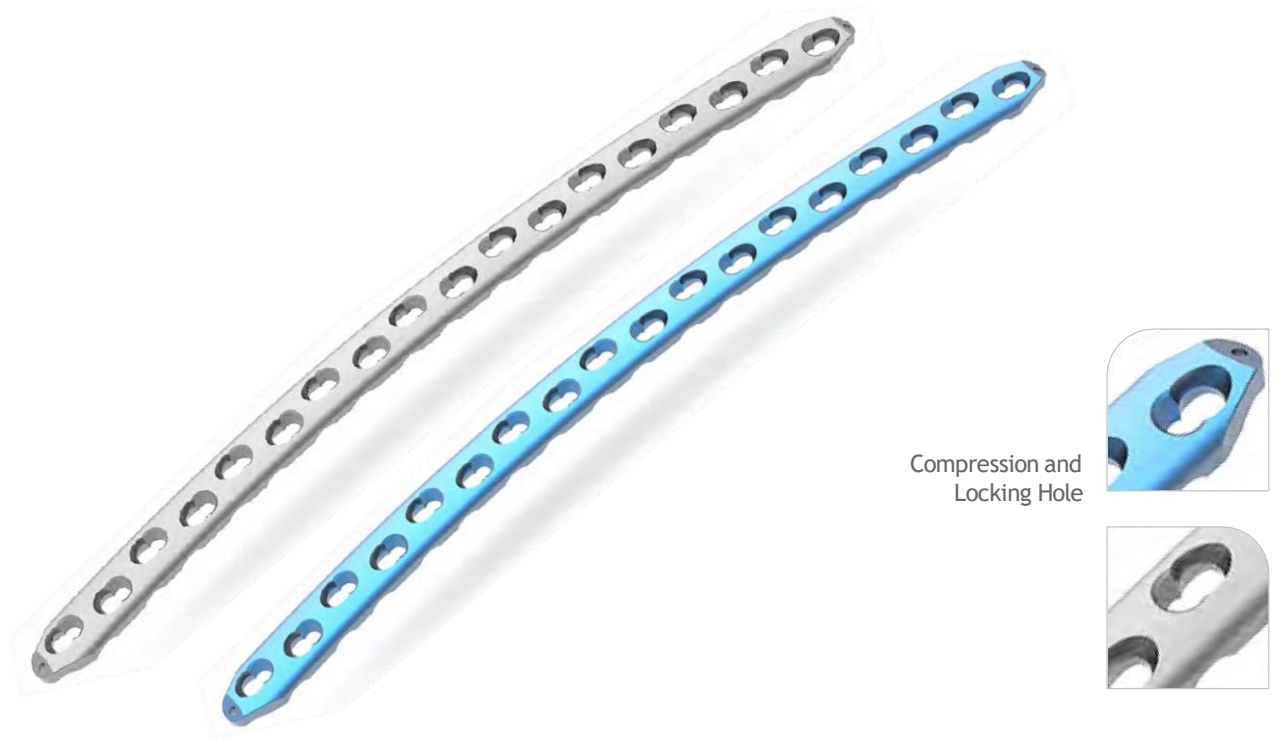


Compression and Locking Hole



Holes	Stainless Steel	Titanium
5	725.205	TI-725.205
6	725.206	TI-725.206
7	725.207	TI-725.207
8	725.208	TI-725.208
9	725.209	TI-725.209
10	725.210	TI-725.210
11	725.211	TI-725.211
12	725.212	TI-725.212
13	725.213	TI-725.213
14	725.214	TI-725.214
15	725.215	TI-725.215
16	725.216	TI-725.216
18	725.218	TI-725.218
20	725.220	TI-725.220
22	725.222	TI-725.222
24	725.224	TI-725.224

4.5/5.0mm Wise-Lock Curved Broad Plate



Holes	Stainless Steel	Titanium
12	750.112	TI-750.112
13	750.113	TI-750.113
14	750.114	TI-750.114
15	750.115	TI-750.115
16	750.116	TI-750.116
17	750.117	TI-750.117
18	750.118	TI-750.118

4.5mm Cortical Screws, Self-Tapping, (Hex Head)

Length (mm)	Stainless Steel	Titanium
20	105.220	TI-105.220
22	105.222	TI-105.222
24	105.224	TI-105.224
26	105.226	TI-105.226
28	105.228	TI-105.228
30	105.230	TI-105.230
32	105.232	TI-105.232
34	105.234	TI-105.234
36	105.236	TI-105.236
38	105.238	TI-105.238
40	105.240	TI-105.240
42	105.242	TI-105.242
44	105.244	TI-105.244
46	105.246	TI-105.246
48	105.248	TI-105.248
50	105.250	TI-105.250
52	105.252	TI-105.252
54	105.254	TI-105.254
* 55	105.255	TI-105.255
56	105.256	TI-105.256
58	105.258	TI-105.258
60	105.260	TI-105.260
65	105.265	TI-105.265
70	105.270	TI-105.270
80	105.280	TI-105.280
* 85	105.285	TI-105.285
* 90	105.290	TI-105.290



* Sizes not available in Screw Caddy

5.0mm Wise-Lock Screw, Self-Tapping, (Hex Head)

Length (mm)	Stainless Steel	Titanium
12	119.012	TI-119.012
14	119.014	TI-119.014
16	119.016	TI-119.016
18	119.018	TI-119.018
20	119.020	TI-119.020
22	119.022	TI-119.022
24	119.024	TI-119.024
26	119.026	TI-119.026
28	119.028	TI-119.028
30	119.030	TI-119.030
32	119.032	TI-119.032
34	119.034	TI-119.034
36	119.036	TI-119.036
38	119.038	TI-119.038
40	119.040	TI-119.040
42	119.042	TI-119.042
44	119.044	TI-119.044
46	119.046	TI-119.046
48	119.048	TI-119.048
50	119.050	TI-119.050
52	119.052	TI-119.052
54	119.054	TI-119.054
56	119.056	TI-119.056
58	119.058	TI-119.058
60	119.060	TI-119.060
65	119.065	TI-119.065
70	119.070	TI-119.070
75	119.075	TI-119.075
80	119.080	TI-119.080
85	119.085	TI-119.085
90	119.090	TI-119.090



5.0mm Wise-Lock Screw, Self-Tapping & Self-Drilling, (Hex Head)

Length (mm)	Stainless Steel	Titanium
12	119.212	TI-119.212
14	119.214	TI-119.214
16	119.216	TI-119.216
18	119.218	TI-119.218
20	119.220	TI-119.220
22	119.222	TI-119.222
24	119.224	TI-119.224
26	119.226	TI-119.226
28	119.228	TI-119.228
30	119.230	TI-119.230
32	119.232	TI-119.232
34	119.234	TI-119.234
36	119.236	TI-119.236
38	119.238	TI-119.238
40	119.240	TI-119.240
42	119.242	TI-119.242
44	119.244	TI-119.244
46	119.246	TI-119.246
48	119.248	TI-119.248
50	119.250	TI-119.250
55	119.255	TI-119.255
60	119.260	TI-119.260
65	119.265	TI-119.265
70	119.270	TI-119.270
75	119.275	TI-119.275
80	119.280	TI-119.280
85	119.285	TI-119.285
90	119.290	TI-119.290



6.5mm Cancellous Screws, 16mm Thread

Length (mm)	Stainless Steel	Titanium
25	111.025	TI-111.025
30	111.030	TI-111.030
35	111.035	TI-111.035
40	111.040	TI-111.040
45	111.045	TI-111.045
50	111.050	TI-111.050
55	111.055	TI-111.055
60	111.060	TI-111.060
65	111.065	TI-111.065
70	111.070	TI-111.070
75	111.075	TI-111.075
80	111.080	TI-111.080
85	111.085	TI-111.085
90	111.090	TI-111.090
95	111.095	TI-111.095
100	111.100	TI-111.100
* 105	111.105	TI-111.105
* 110	111.110	TI-111.110
* 115	111.115	TI-111.115
* 120	111.120	TI-111.120



* Sizes not available in Screw Caddy

6.5mm Cancellous Screws, 32mm Thread

Length (mm)	Stainless Steel	Titanium
35	112.035	TI-112.035
40	112.040	TI-112.040
45	112.045	TI-112.045
50	112.050	TI-112.050
55	112.055	TI-112.055
60	112.060	TI-112.060
65	112.065	TI-112.065
70	112.070	TI-112.070
75	112.075	TI-112.075
80	112.080	TI-112.080
85	112.085	TI-112.085
90	112.090	TI-112.090
95	112.095	TI-112.095
100	112.100	TI-112.100
* 105	112.105	TI-112.105
* 110	112.110	TI-112.110
* 115	112.115	TI-112.115
* 120	112.120	TI-112.120



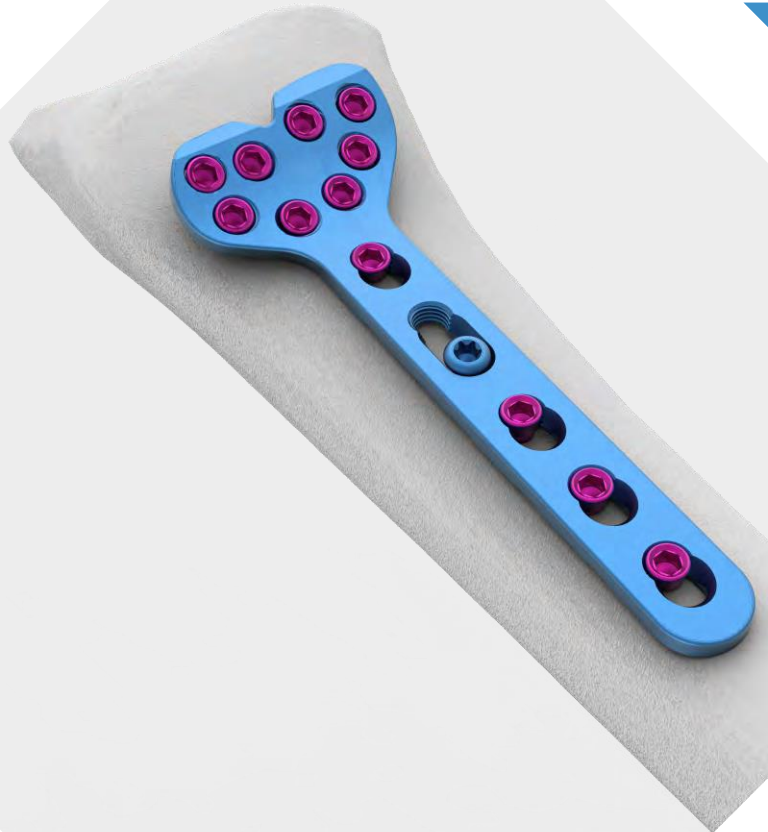
* Sizes not available in Screw Caddy

6.5mm Cancellous Screws, Full Thread

Length (mm)	Stainless Steel	Titanium
35	113.035	TI-113.035
40	113.040	TI-113.040
45	113.045	TI-113.045
50	113.050	TI-113.050
55	113.055	TI-113.055
60	113.060	TI-113.060
65	113.065	TI-113.065
70	113.070	TI-113.070
75	113.075	TI-113.075
80	113.080	TI-113.080
85	113.085	TI-113.085
90	113.090	TI-113.090
95	113.095	TI-113.095
100	113.100	TI-113.100
* 105	113.105	TI-113.105
* 110	113.110	TI-113.110
* 115	113.115	TI-113.115
* 120	113.120	TI-113.120



* Sizes not available in Screw Caddy

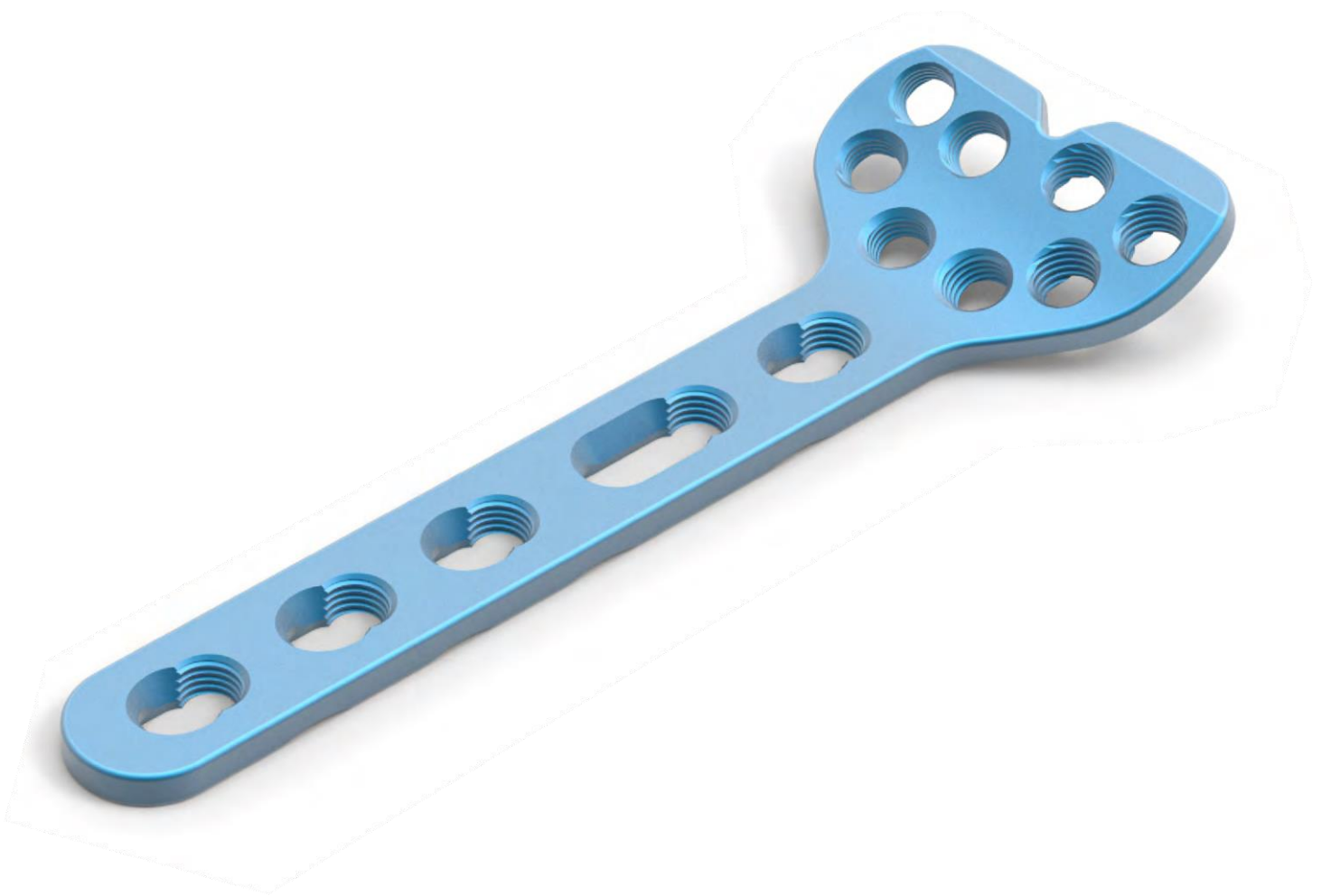


Surgical Technique

2.4mm Wise-Lock Distal Radius System

INTRODUCTION

The **jAZZMAN MEDICAL'S** 2.4 mm Radius System (Wise-Lock) consists of variety of Bone plates & fixed angle Bone Screws. This system is a single use implantable device for long term duration (intended for continuous use for more than 30 days) contacting radius bone and its surrounding tissues.



INDICATIONS:

The Distal Radius Implants are intended for:

- Displaced extra-articular and intra-articular distal radius fractures and corrective osteotomies of the distal radius.
- Dorsally displaced fractures
- Extra-articular fractures with metaphyseal defect (AO classification 23-A3)
- Open joint reconstruction (AO classification 23-C1, C2, C3)
- Combination of distal radius with carpal and metacarpal Fractures
- Corrective osteotomies

CONTRAINDICATIONS:

Contraindications include but are not limited to:

- Infection, local to operative site
- Signs of local inflammation
- Morbid Obesity
- Severely comminuted fractures in which bone fractures are too small or numerous to fix or maintain a reduced position
- Metal sensitivity or intolerance
- Alcohol or drug addict
- Symptomatic Arthritis



GENERALTECHNIQUE

Plate Selection And Contouring:

Plate selection is done according to the fracture pattern and contouring is done according to post reduction anatomy of distal radius. Fine bending of locking plates of Juxta-articular or extra-articular plates may be achieved using plate holder or threaded Drill guide.

Precaution:

Care should be taken to avoid over-bending because the bending pin may become dislodged from the plate hole and damage the plate's threads

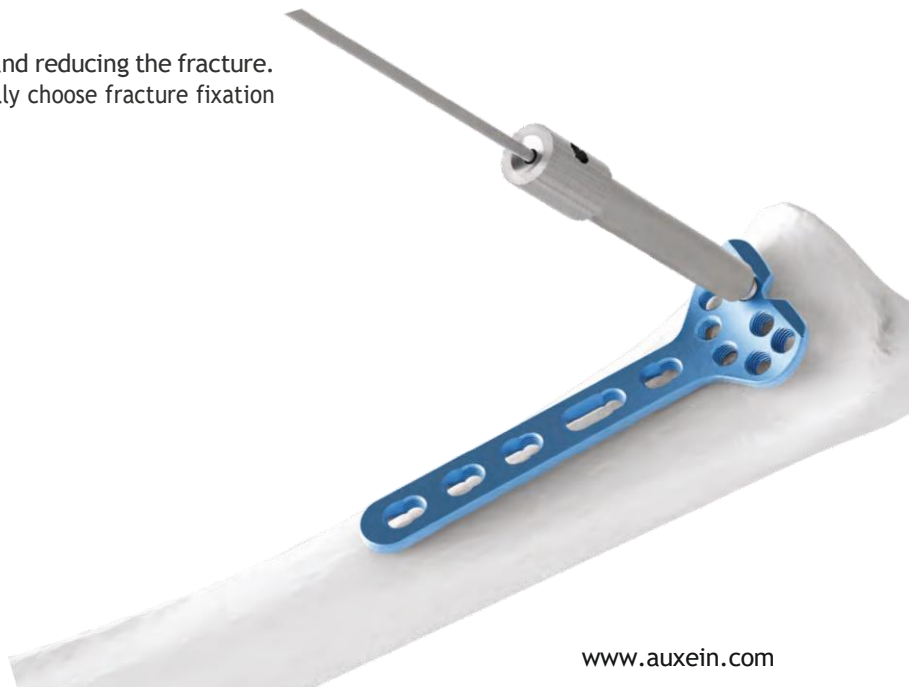


Temporary Fixation:

Fracture reduction is done with traction and reduced because of ligamentotaxis. Plate is placed over fracture site (Dorsal/Volar) and temporary fixed with k-wire. K-wire can be placed through threaded drill guide

Precaution:

care should be taken while inserting the k-wire and reducing the fracture. choose the appropriate diameter of k-wire. carefully choose fracture fixation approach dorsal or volar.



Cortical Screw Insertion:

Standard cortical screws should be used first for fixation in the shaft. Locking screw in the head of plate gives an advantage to support articular surface and prevent loss of reduction by forming a fixed angle construct.

Precaution: Choose appropriate length of cortical screw. Excessive tightening is avoided.

Drill bit insertion: The flange on T handle is pushed away from the handle and the appropriate drill bit is inserted according to requirement. The flange is finally released to lock the drill bit in T handle.

Precaution: Choose the appropriate diameter of drill bit. Care should be taken while drilling to avoid excessive drilling.



Predrill Screw Hole:

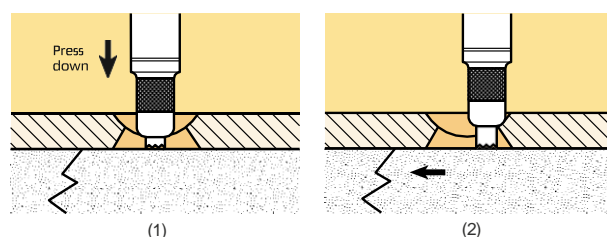
According to required screw, use appropriate Double drill guide 1.8/2.4 or 2.0/2.7 mm to predrill the hole for insertion of cortical screw. For 2.4mm cortical screw, 1.8mm drill bit is used for threaded hole while a 2.4mm drill bit is used for the gliding hole. Similarly for 2.7mm cortical screw, 2.0mm drill bit is used for threaded hole while a 2.7mm drill bit is used for the gliding hole.

Precaution: Selection of correct drill bit should be carefully chosen for the gliding hole.

The hole can be drilled at neutral or compression position according to requirement of the reduction as described below:

1. Predrilling in neutral position: The upper part of the inner sleeve of drill guide is depressed and is positioned in plate hole remote from the fracture as indicated by 1 in adjoining figure.

2. Predrilling in compression position: The upper part of the inner sleeve of drill guide is not depressed and is positioned in plate hole remote from the fracture as indicated by 2 in adjoining figure.



If required, the tap for both 2.4 and 2.7mm screws are available. These quick coupling taps can be inserted into the T handle and used to create screw thread pattern in the bone.



Determining Screw length:

For 2.4mm Screws, use Depth Gauge (5001-2.4) in the predrill hole to determine the screw length. Similarly for 2.7mm Screw, use Depth Gauge (5001-2.7) in the predrill hole to determine the screw length. Double drill guide is removed before inserting the depth gauge to measure the screw length.

Precaution: Care should be taken to choose appropriate length using depth gauge. Selection of excessive or too short screw length can create complications in bone healing as excessive length can lead to soft tissue irritation or damage.

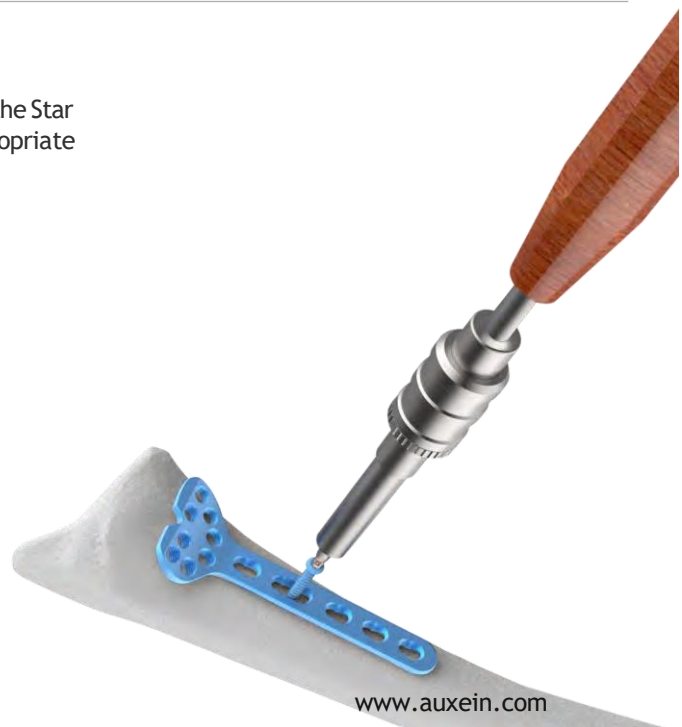


Screw

Depending on the screw head type, the Hexagonal head Screwdriver or the Star Head Screwdriver is used to pick and insert the cortical screw of appropriate determined length into the predrill hole.

Insertion:

Precaution: Care should be taken while screw insertion. Avoid excessive tightening as it can lead to screw breakage and recess deformation. And also improper tightening can lead to loosening of implant and irritation or soft tissue damage.



WISE-LOCK SCREW INSERTION:

Predrill Screw Hole:

For 2.4mm Wise-Lock screw, Threaded Drill guide 2.4 is used. The Threaded Drill guide is aligned with the trajectory of the threaded plate hole and the guide is approximately given a quarter counter-clockwise turn until the thread engages. Finally the guide is advanced clockwise until firmly seated. Drill bit of 1.8mm is inserted into the threaded drill guide to drill the hole for screw insertion.

Precaution: Selection of correct drill bit should be carefully chosen.

Determining

Screw

Length:

As mentioned earlier, the appropriate Depth Gauge is used according to the diameter of the screw to measure the required screw length. The threaded drill guide is first removed before inserting the Depth Gauge to measure the desirable screw length.

Precaution: Care should be taken to choose appropriate length using depth gauge. Selection of excessive or too short screw length can create complications in bone healing.



Screw

Depending on the screw head type, the Hexagonal head Screwdriver or the Star Head Screwdriver is used to pick and insert the wise lock screw of appropriate determined length into the predrill hole.

For picking and inserting screw, the holding sleeve flange is pulled towards the screwdriver handle and the screw is attached to the screwdriver. Now, the flange is release to lock the screw head into the screwdriver.

Precaution: Care should be taken while screw insertion. Avoid excessive tightening or loosening. Choose appropriate size torque limiter . For example 0.8Nm torque limiter for insertion of 2.4mm Wise-Lock screw, self-tapping (Star Head).

Insertion:



SURGICAL APPROACH

Volar Plating Surgical Technique:

Primary is plate selection that depends upon fracture pattern and patient anatomy. Various Volar Plating options are available.

- 1. Patient Positioning:** Patient is placed in supine position on an operating table. Forearm is rested on hand table in supinated position so that palm faces upwards
- 2. Incision:** Begin the incision longitudinal just lateral to FCR (Flexor Carpi radialis) tendon. Superficial dissection is done between FCR tendon and radial artery that exposes pronator quadratus muscle. Detach pronator quadratus muscle from lateral aspect of distal radius towards ulna so that distal radius fracture is exposed. Leave the volar wrist capsule to avoid devascularisation and stability of volar wrist ligaments. After initial incision, the **Hohmann Retractor** is used to pull soft tissue away from the operative field and expose the bony tissues being operated on.
- 3. Plate fixation:** The above mentioned General technique is used for plate fixation on the bone.



Volar Approach



Hohmann Retractor

Dorsal Plating Surgical Technique:

Primary is plate selection that depends upon fracture pattern and patient anatomy. Various dorsal plating options are available.

- 1. Patient Positioning:** Patient is placed in supine position on an operating table. Forearm is rested on hand table in supinated position so that the palm faces downwards.
- 2. Incision:** Make a longitudinal incision 6-9 cm in length crossing wrist joint from the base of second metacarpal over listers tubercle. Open the extensor retinaculum over third compartment. Dissect the EPL (extensor pollicis longus) tendon and retract it. In deep dissection second and fourth dorsal compartment are elevated subperiosteally to preserve integrity of compartment. Continue to dissect towards radial border of DRUJ and on radial side. Dissect toward the brachioradialis tendon to place dorsoradial plate.
- 3. Plate Fixation:** The above mentioned General technique is used for plate fixation on the bone.



Dorsal Approach

2.4mm Wise-Lock Distal Radius Volar Plate, Extra-Articular, (5 Head Holes)

	Left Direction	Right Direction
Holes	Titanium	Titanium
3	TI-M12.03	TI-M13.03
5	TI-M12.05	TI-M13.05



2.4mm Wise-Lock Distal Radius Volar Plate, Extra-Articular, (4 Head Holes)

	Left Direction	Right Direction
Holes	Titanium	Titanium
3	TI-M14.03	TI-M15.03
5	TI-M14.05	TI-M15.05



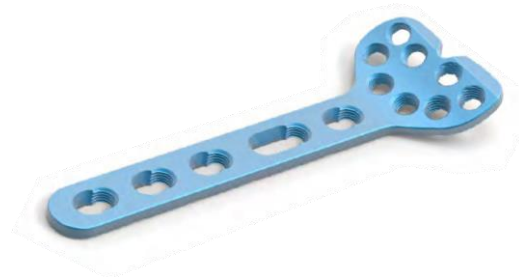
2.4mm Wise-Lock Volar Buttress Plate, (5 Head Holes)

	Left Direction	Right Direction
Holes	Titanium	Titanium
3	TI-M11.03L	TI-M11.03R



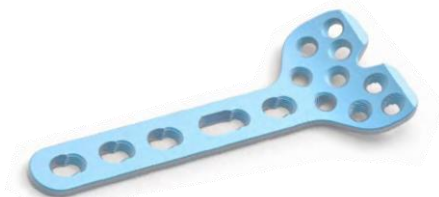
2.4mm Wise-Lock Volar Column Distal Radius Plate, (8 Head Holes)

	Left Direction	Right Direction
Holes	Titanium	Titanium
3	TI-759.103L	TI-759.103R
4	TI-759.104L	TI-759.104R
5	TI-759.105L	TI-759.105R



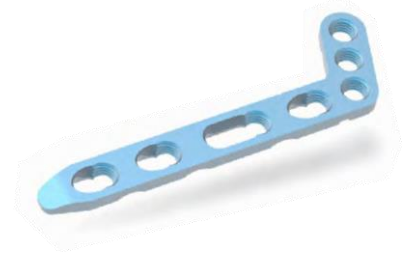
2.4mm Wise-Lock Volar Column Distal Radius Plate (9 Head Holes)

	Left Direction	Right Direction
Holes	Titanium	Titanium
3	TI-759.203L	TI-759.203R
4	TI-759.204L	TI-759.204R
5	TI-759.205L	TI-759.205R



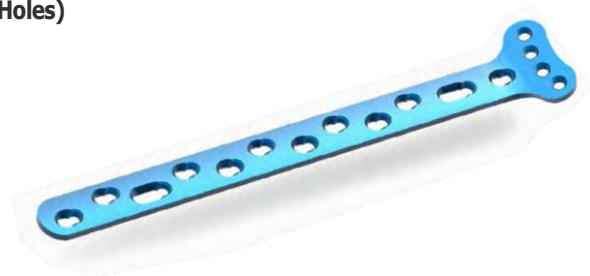
2.4mm Wise-Lock "L" Distal Radius Dorsal Plate, Oblique

	Left Direction	Right Direction
Holes	Titanium	Titanium
3	TI-M06.03	TI-M07.03
4	TI-M06.04	TI-M07.04



2.4mm Wise-Lock Distal Radius Volar Plate, Extra-Long, (4 Head Holes)

	Head with 4 Holes
Holes	Titanium
8	TI-M16.08
10	TI-M16.10
12	TI-M16.12



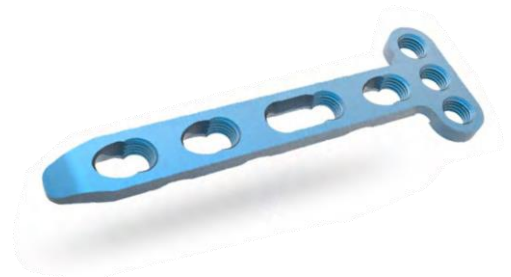
Wise-Lock "T" Wrist Volar Plate

	Left Direction	Right Direction
Holes	Titanium	Titanium
3	6137/06	6136/06
4	6137/01	6136/01



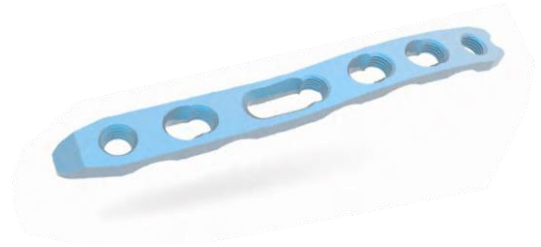
2.4mm Wise-Lock "T" Distal Radius Dorsal Plate, (3 Head Holes)

Holes	Titanium
3	TI-M08.03
4	TI-M08.04



2.4mm Wise-Lock Distal Radius Dorsal Plate, Straight

Holes	Titanium
5	TI-M01.05
6	TI-M01.06



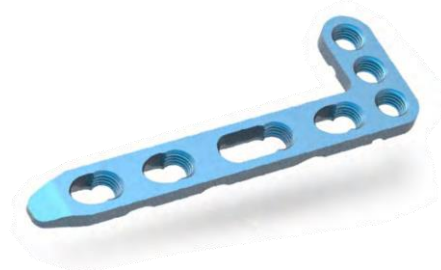
2.4mm Wise-Lock "L" Distal Radius Dorsal Plate, (2 Head Holes)

	Left Direction	Right Direction
Holes	Titanium	Titanium
3	TI-M02.03	TI-M03.03
4	TI-M02.04	TI-M03.04



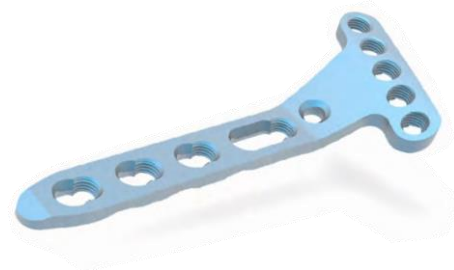
2.4mm Wise-Lock "L" Distal Radius Dorsal Plate, (3 Head Holes)

	Left Direction	Right Direction
Holes	Titanium	Titanium
3	TI-M04.03	TI-M05.03
4	TI-M04.04	TI-M05.04



2.4mm Wise-Lock Distal Radius Volar Plate, (5 Head Holes)

	Left Direction	Right Direction
Holes	Titanium	Titanium
3	TI-M09.03	TI-M10.03
5	TI-M09.05	TI-M10.05



2.5mm Volar Screws, Self Tapping, Partial Thread

Length (mm)	Titanium
10	6152/11
12	6152/01
14	6152/02
16	6152/03
18	6152/04
20	6152/05
22	6152/06
24	6152/07
26	6152/08
28	6152/09
30	6152/10



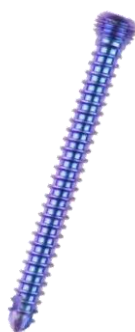
2.4mm Wise-Lock Screws, Self Tapping

Length (mm)	Titanium
6	TI-M17.06
8	TI-M17.08
10	TI-M17.10
12	TI-M17.12
14	TI-M17.14
16	TI-M17.16
18	TI-M17.18
20	TI-M17.20
22	TI-M17.22
24	TI-M17.24
26	TI-M17.26
28	TI-M17.28
30	TI-M17.30



2.5mm Volar Screws, Self Tapping, Full Thread

Length (mm)	Titanium
10	6151/10
12	6151/01
14	6151/02
16	6151/03
18	6151/04
20	6151/05
22	6151/06
24	6151/07
26	6151/08
28	6151/09
30	6151/11



2.4mm Cortical Screws, Self Tapping

Length (mm)	Titanium
6	TI-M18.06
8	TI-M18.08
10	TI-M18.10
12	TI-M18.12
14	TI-M18.14
16	TI-M18.16
18	TI-M18.18
20	TI-M18.20
22	TI-M18.22
24	TI-M18.24
26	TI-M18.26
28	TI-M18.28
30	TI-M18.30



2.0mm Peg Screws

Length (mm)	Titanium
10	6153/09
12	6153/10
14	6153/11
16	6153/01
18	6153/02
20	6153/03
22	6153/04
24	6153/05
26	6153/06
28	6153/07
30	6153/08



2.7mm Cortical Screws, Self Tapping

Length (mm)	Titanium
10	TI-103.210
12	TI-103.212
14	TI-103.214
16	TI-103.216
18	TI-103.218
20	TI-103.220
22	TI-103.222
24	TI-103.224
26	TI-103.226
28	TI-103.228
30	TI-103.230



2.4mm Wise-Lock Distal Radius Plate Set (Dorsal & Volar)

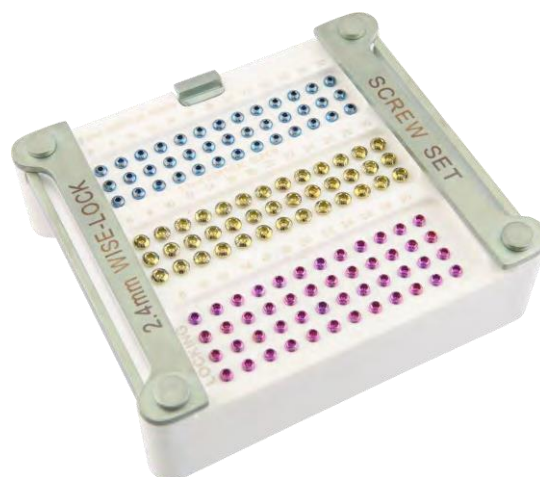


Dorsal



Volar

2.4mm Distal Radius Screw Set



Instruments



Double Drill Guide

Codes	Dia (mm)
3767-2.4	2.4/1.8
3767-2.7	2.7/2.0



Drill Bit - Quick Coupling End

Codes	Dia (mm)	Length (mm)
2100-1.8-110	1.8	110
2100-2.4-100	2.4	100
2100-2.0-100	2.0	100
2100-2.7-100	2.7	100



1328.024

2.4mm Screw Driver with Fiber Handle "Star drive"



3406.02

Hexagonal Screw Driver with Holding Sleeve, 2.0mm Tip



Depth Gauge

Codes	Description
5001-2.4	2.0 and 2.4mm Screws

Threaded Drill Guide 2.4 for Drill Bit Ø 1.8mm



TDG-1.8

Threaded Drill Guide 2.7 for Drill Bit Ø 2.0mm



TDG-2.7



Tap

Codes	Dia (mm)
2104-010	2.4mm Screws
2104-01	2.7mm Screws



TQS-2.0

Torque Screw Driver-2.0mm, 0.8Nm



Depth Gauge

Codes	Description
5001-2.7	2.7mm Screws



2107.000 **Reduction Forcep with Points**



5001-032 **Hohmann Retractor, Small 6mm**



2701.215 **Plate Holder**



2108.000 **Reduction Forcep, Serrated Jaw**



2149-1003 **Periosteal Elevator with Fibre Handle**



2107.00B **Reduction Forcep, Bend Tip**



2139.000 **Sharp Hook**

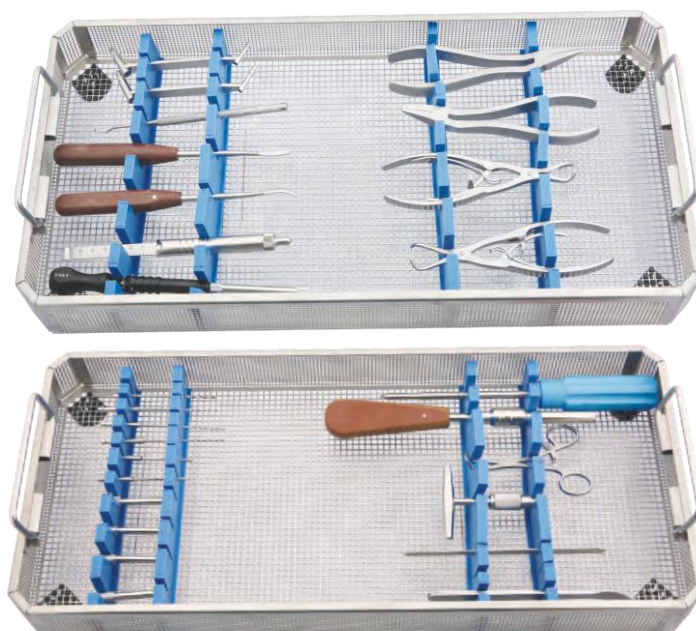


3402.000 **T-Handle Quick Coupling**

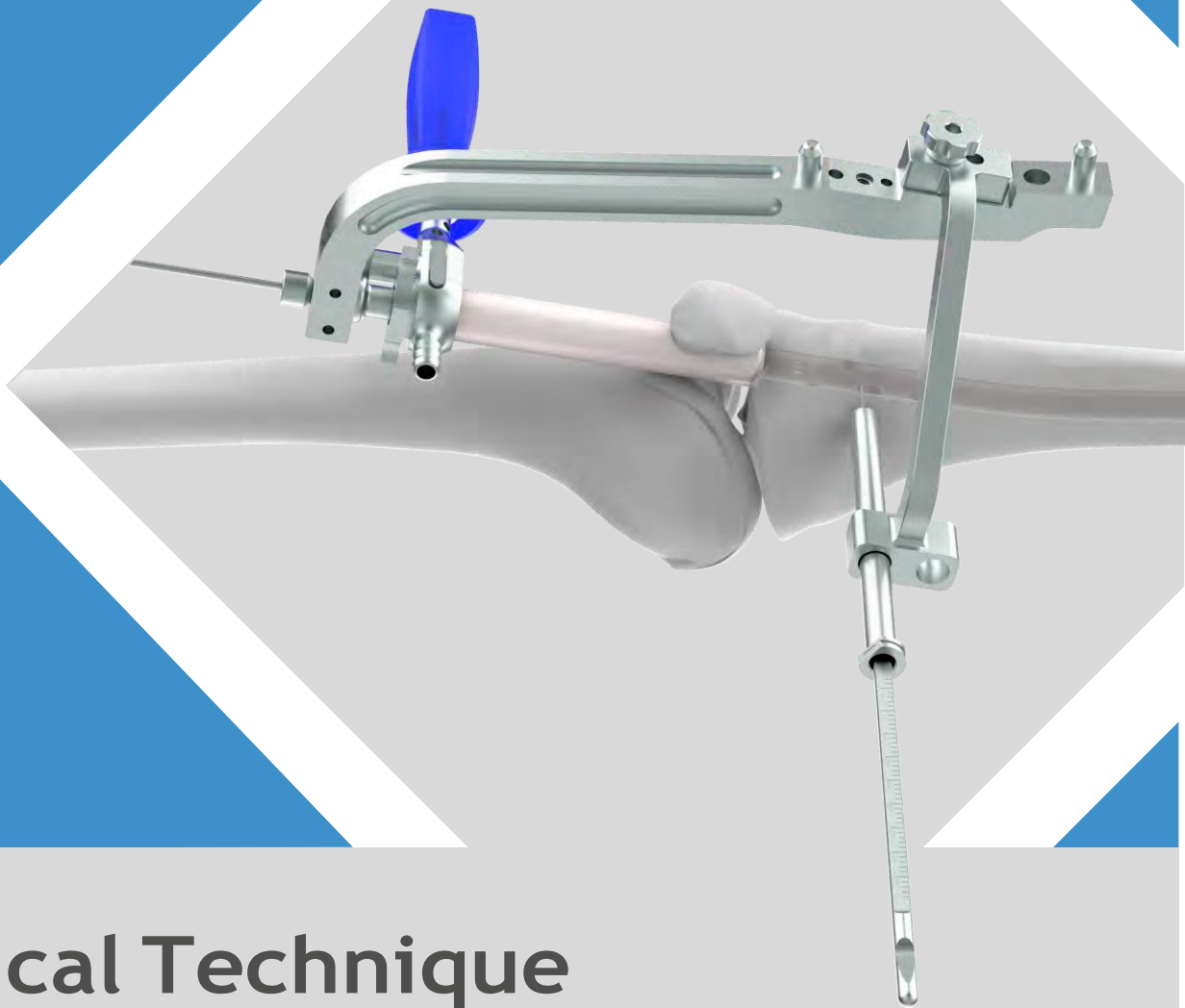


451-1.8-150 **Kirschner Wire Trocar Tip at Both End Ø1.8mm x 150mm**

2300.000

2.4mm Wise-Lock Distal Radius Instrument Set

Codes	Set consisting of:	Units
2100-1.8-110	Drill Bit Ø 1.8mm x 110mm, Quick Coupling	2
2100-2.4-100	Drill Bit Ø 2.4mm x 100mm, Quick Coupling	2
2100-2.0-100	Drill Bit Ø 2.0mm x 100mm, Quick Coupling	2
2100-2.7-100	Drill Bit Ø 2.7mm x 100mm, Quick Coupling	2
2104-010	Tap for Ø 2.4mm Screws, Quick Coupling	1
2104-01	Tap for Ø 2.4mm Screws, Quick Coupling	1
3767-2.4	Double Drill Guide 2.4/1.8	1
3767-2.7	Double Drill Guide 2.7/2.0	1
TDG-1.8	Threaded Drill Guide 2.4, for Drill Bit Ø1.8mm	2
TDG-2.7	Threaded Drill Guide 2.7, for Drill Bit Ø2.0mm	2
3402.000	T Handle with Quick Coupling	1
3406.02	Hexagonal Screw Driver with Holding Sleeve, 2.0mm Tip	1
1328.024	2.4mm Screw Driver with Fiber Handle " Star drive"	1
TQS-2.0	Torque Screw Driver - 2.0mm Tip, 0.8Nm	1
5001-2.4	Depth Gauge, for 2.0mm and 2.4mm Screws	1
5001-2.7	Depth Gauge, for 2.7mm Screws	1
2139.000	Sharp Hook	1
2107.000	Reduction Forcep with Points	1
2108.000	Reduction Forcep, Serrated Jaw	1
2149-1003	Reduction Forcep, Bend Tip	1
2107.00B	Plate Holder	2
2701.215	Periosteal Elevator, 3mm	1
5001-032	Hohmann Retractor, Small 6mm	1
451-1.8-150	Kirschner Wire Ø1.8mm x 150mm	5
A10.042	Container for 2.4mm Wise-Lock Distal Radius Instrument Set	1



Surgical Technique

Suprapatellar Instrumentation for Expert Tibial Nail

Introduction

The Expert Tibial Nail enables the surgeon to further extend the spectrum of fractures eligible for intramedullary nailing. This nail is indicated for fractures of metaphyseal and certain intra articular fractures of tibial head and pilon tibial. Expert Tibia Nail enhances the stability of constructed bone-nail and reduces the risk for secondary misalignment. Multidirectional interlocking screws ensure that alignment can be well maintained and stability preserved in short proximal or distal tibial segments. The end cap achieves angular stability between the proximal oblique screw and nail.



Locking Options

Proximal Segment Fractures For Proximal fractures, it is recommended to lock the nail with knee in extension. This neutralizes the deforming forces on proximal fragments caused by the quadriceps mechanism and relieves the pressure on soft tissue usually associated with tibial nail insertion instruments. This position also facilitates assessment of rotational alignment prior to locking.

It is recommended to lock distally first to allow intra-operative compression and reduction.



Indications

The Expert Tibia Nail is indicated for fractures in the tibial shaft as well as for metaphyseal and certain intra-articular fractures of the tibial head and the pilon tibial:

- 41-A2/A3 • All shaft fractures
- 43-A1/A2/A3
- Combinations of these fractures



Product Specifications

Expert Tibial Nail

Diameters:

Ø8mm, Ø9mm, Ø10mm, Ø11mm & Ø12mm

Length:

255mm - 375mm (With 15mm difference)

Available In:

Stainless Steel and Titanium

Color Coding (only for Titanium) :

Type-II For Expert Tibia Nail

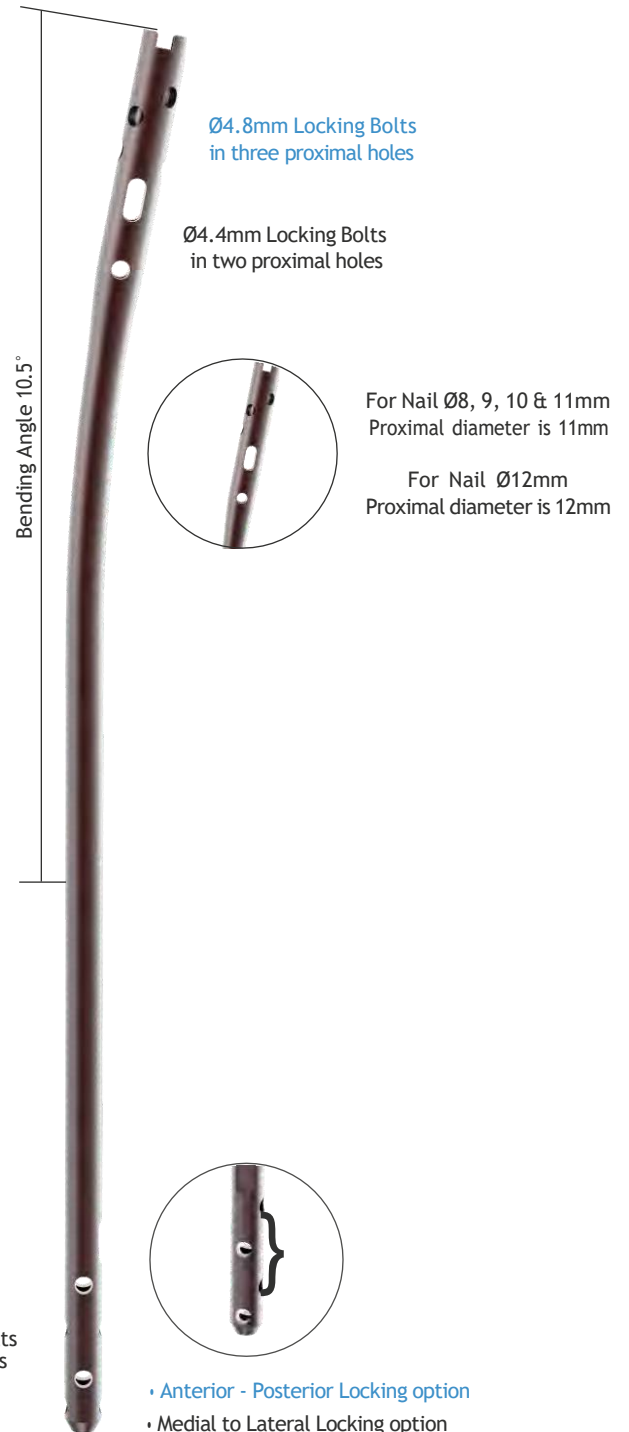
Cannulation:

All Expert Tibia Nails are cannulated which enables nail insertion over guide wire for reamed or unreamed techniques.

The ball tip guide wires may be removed through the nail and insertion handle assembly (no exchange tube required).

Advanced Nail Design:

- New Anatomic bend for ease of nail insertion.
- Two state of the art medio-lateral (ML) locking options enable primary compression or secondary controlled dynamization.
- Two ML and one anterior posterior (AP) locking options for stability of the distal fragment.



Important: Solid Nail for unreamed technique are also available on special request

End Cap For Expert Tibia Nail

Length:

0mm, 5mm, 10mm and 15mm

Available in:

Stainless Steel and Titanium

Color coding (only for Titanium) :

Type-II For End Cap

Features:

- End Cap prevents ingrowth of hard & soft tissue which facilitates nail extraction.
- 0 mm End Cap sits flush with nail.
- End Cap with different option of length can extend nail height if nail is over inserted.
- Securely lock the most proximal oblique locking screw to create a fixed-angle construct.
- Cannulated.



Ø4.8mm Locking Bolt, Self-Tapping, For Expert Tibia Nail

Length:

25mm - 90mm (With 5mm difference)

Available in:

Stainless Steel and Titanium

Color Coding (only for Titanium) :

Type-II For Ø4.8mm Locking Bolt

Ø4.4mm Locking Bolt, Self-Tapping, For Expert Tibia Nail

Length:

24mm - 88mm (With 2mm difference)

Available in:

Stainless Steel and Titanium

Color Coding (only for Titanium) :

Type-II For Ø4.4mm Locking Bolt

Features:

- Thread closer to screw head for better and improved stability
- Self Tapping
- Hex head
- Larger cross section for improved mechanical resistance.



Opening The Tibia

1. Position patient

Position the patient supine on the radiolucent table. Ensure that the knee of the injured leg can be flexed 10° - 20°. Position the image intensifier so that visualization of the tibia, including the articular surface proximally and distally, is possible in AP and lateral views.

The knee roll can be placed under the lower part of the thigh if it obstructs the view of the tibial plateau in the AP view.

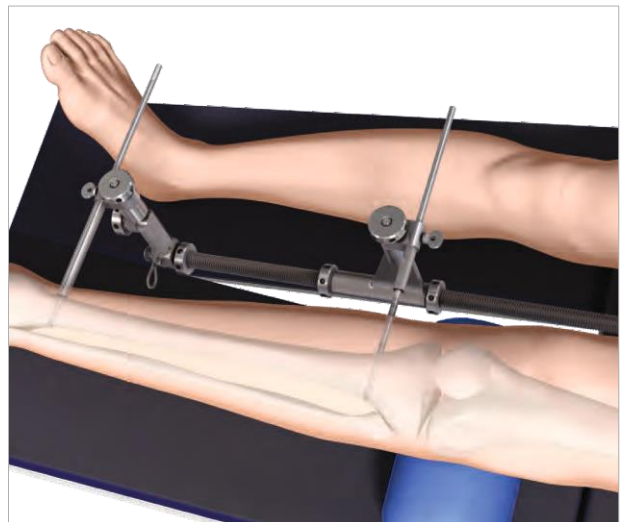


2. Reduce fracture

Perform closed reduction manually by axial traction under image intensifier. The use of the Large Distractor may be appropriate in certain circumstances where part of the thigh if it obstructs the view of the tibial plateau in the AP view.

Notes:

The reduction can be temporarily fixed with reduction clamps. In epiphyseal fractures, the condyles or the pilon are fixed first in order to enable the nail insertion.



3. Measuring Nail length and diameter:

The C-Arm is positioned in such a way to get AP view of the Distal Tibia. The Radiographic ruler (**7-112-24**) is held parallel to the Tibia bone. The ruler is adjusted until the distal end of ruler is aligned with the desired nail insertion depth.

After finalizing the position of radiographic ruler, the C-Arm is moved to the Proximal Tibia to take an image in AP view. The length of the nail is determined from reading on the ruler pointing in level or just below the tibial plateau.

Under C-Arm, the diameter gauge part of the radiographic ruler is placed over the narrowest part of the Tibia medullary canal in either AP or lateral view. The reading on the diameter gauge coinciding with the canal width is chosen.

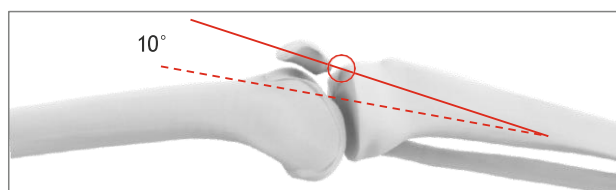
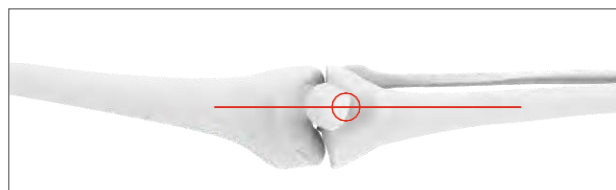
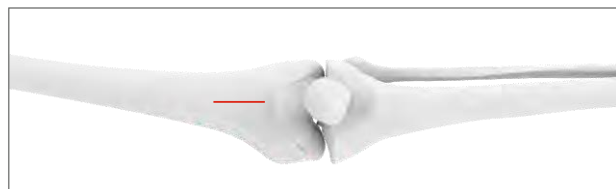
Note: All the readings are to be taken only after the compression of the bone has been achieved. As an alternative, these readings can be measured from the uninjured Tibia bone.



4. Entry Point

With the knee in full extension, make a 2-4 cm longitudinal skin incision 4 cm proximal to the superior pole of the patella. The deep incision, also longitudinal, splits the quadriceps tendon in its midsubstance, just above its insertion into the patella and enters the knee joint through the suprapatellar pouch. Blunt dissection can be used to loosen the patella in the suprapatellar pouch, allowing the patella to lift off. Displace the patella anteriorly.

The entry point defines the optimal position of the Expert Tibial Nail in the intramedullary canal. This is more important for proximal and distal third fractures to prevent fragment displacement.



In anterior - posterior (AP) view the entry point is in line with the axis of the intra-medullary canal and with the lateral tubercle of the inter-condylar eminence.

In lateral view the entry point is at the ventral edge of the tibial plateau.

5. Insert protection sleeves

7-112-02	Protection Sleeve Handle for Expert Tibia Nail - Suprapatellar Insertion
7-112-03	Outer Protection Sleeve for Expert Tibia Nail - Suprapatellar Insertion
7-112-04	Protection Sleeve 16/14.5mm for Expert Tibia Nail - Suprapatellar Insertion
7-112-05	Trocar Ø14.5mm, PEEK, for Expert Tibia Nail - Suprapatellar Insertion



5. Insert protection sleeves

Assemble the handle, inner protection sleeve, outer protection sleeve, and trocar. Rotate the knob to lock the assembly into the handle during insertion.

Insert the handle assembly through the incision into the knee joint, so that it glides between the articular surface of the patella and the trochlea of the distal femur and rests securely in this groove, while the patella is displaced anteriorly above the cannula. When the trocar reaches the surface of the tibia, rotate the knob on the handle to allow the trocar to slide out, as the cannula is advanced to the anterior surface of the proximal tibia. Remove the trocar.

Precaution: The knee must remain in extension once the handle assembly has been inserted.



6. Insert guide wire

After removal of the trocar, insert the centering sleeve (**7-112 06**) through the inner protection sleeve.

Advance to the anterior surface of the tibia.

Slight adjustment of the knee flexion (between 10° and 20°) will provide the ideal radiographic location for the starting point and insertion of a guide wire.

Insert the guide wire approximately 8cm - 10cm and check the position under imaging in the AP and lateral views.

Adjustments to the guide wire (**520-013**) location can be “dialed-in” by rotating the centering sleeve to place a second guide wire while the first guide wire remains in place.

After correct placement of the second guide wire, remove the initial guide wire and centering sleeve.



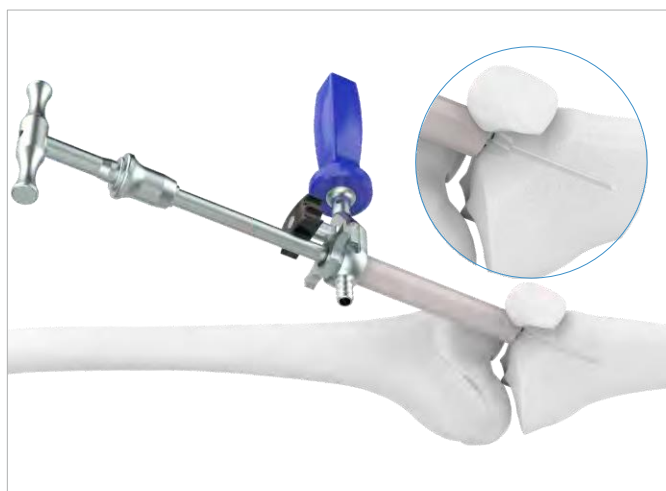
7. Anchor handle for protection sleeves

Use a 3.2 mm guide wire to anchor the handle assembly to the femoral condyles and maintain the position of the handle assembly during the procedure. This anchor prevents the cannula from backing out and off of the tibia.

8. Open medullary canal

Place the drill bit (**520-004**) Guide Wire With Threaded Tip $\text{\O}3.2\text{mm}$ x Thread Length 10mm x Length 300mm over the guide wire, through the inner protection sleeve, and down to the bone. Drill to a depth of approximately 8 -10 cm. The guide wire and drill bit should not reach the posterior cortex. Remove the drill bit and guide wire.

Precaution: Dispose of the guide wire. Do not reuse.



Reaming (optional)

Precaution: Do not ream without the inner protection sleeve in place to protect the outer protection sleeve.

Inserting the reaming rod

Insert the 2.5 mm reaming rod with ball tip and extension into the medullary canal to the desired insertion depth.

Ream








Starting with the 8.5 mm diameter reaming head, ream to a diameter of 0.50 mm - 1.0 mm greater than the nail diameter. Ream in 0.5 mm increments and advance the reamer with steady, moderate pressure. Do not force the reamer. Partially retract the reamer often to clear debris from the medullary canal.



The reamer can catch on the edge of the inner protection sleeve because of the sharp angle entering the tibia (1). Stop reamer rotation and lift up on the drill to center the reamer shaft in the sleeve (2). Move the reamer in and out until the reamer comes out.



Instruments:

7-112-02	Protection Sleeve Handle for Expert Tibia Nail - Suprapatellar Insertion	
7-112-03	Outer Protection Sleeve for Expert Tibia Nail - Suprapatellar Insertion	
7-112-04	Protection Sleeve 16/14.5mm for Expert Tibia Nail - Suprapatellar Insertion	
7-112-26	Quick Coupling T Handle for Expert Tibia Nail - Suprapatellar Insertion	
7-112-30	Flexible Reamer Shaft (Jacob Connection) for Expert Tibia Nail - Suprapatellar Insertion	
7-112-40	Reamer Head	
520-058	Guide wire without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Tibia Nail	

Inserting the Nail

1. Assemble insertion instruments

Orient the insertion handle anteriorly, and match the tang on the handle to the notch in the nail.

Place the connecting screw into the insertion handle and thread it into the proximal nail end, using the rod pusher for reaming rod.

Verify the nail is oriented properly on the insertion handle; secure the assembly with the screwdriver

Alternatively, secure the assembly using the screwdriver.

Remove the inner protection sleeve from the handle for protection sleeves.

When removing the inner protection sleeve, lift or rotate handle to gain access to the lower lever lock. Depress both upper and lower lever locks and slide the inner protection sleeve out.



7-112-01	Insertion Handle for Expert Tibia Nail - Suprapatellar Insertion	
7-112-19	Nail Holding Bolt, Long, for Expert Tibia Nail - Suprapatellar Insertion	
7-112-46	Allen Key, Hex 5mm for Expert Tibia Nail (Suprapatellar Insertion)	

2. Insert nail

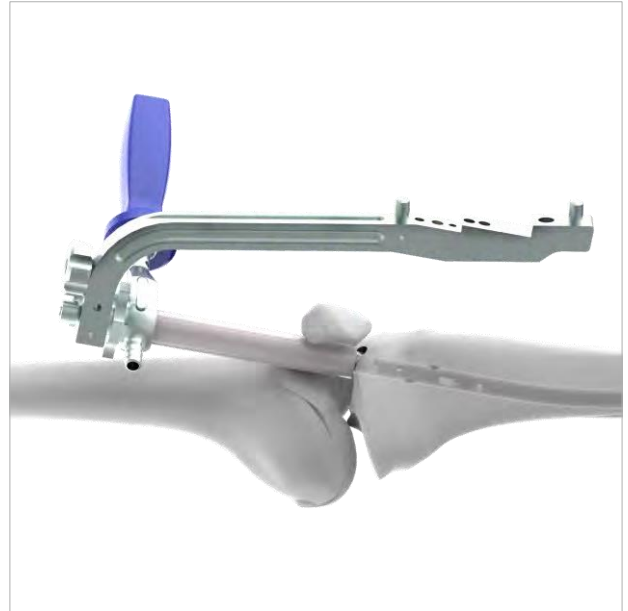
Ensure inner protection sleeve is removed.

Insert the nail into the intramedullary canal. Use a twisting motion to advance the nail.

- Monitor the nail passage across the fracture; control in two planes to avoid malalignment
- Insert the nail until it is at or below the tibial opening. Check final nail position in AP and lateral views.

Note:

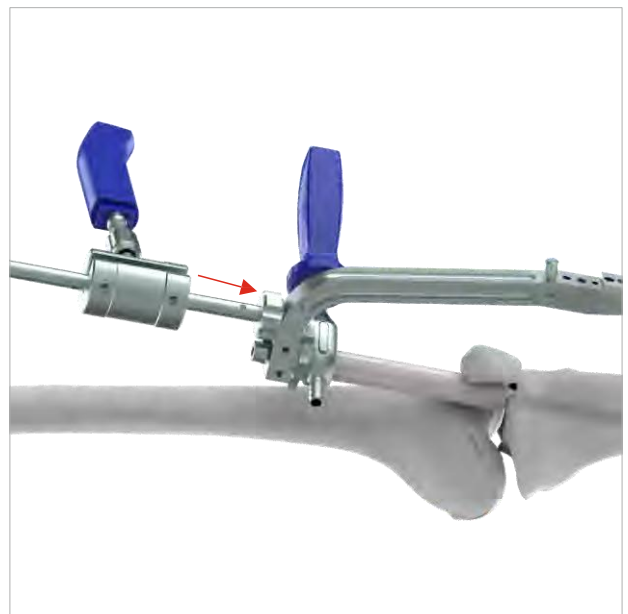
For proximal locking, mount the aiming arm only when the tibial nail has been completely inserted, otherwise the aiming arm may loosen during nail insertion.



Optional instruments

If needed, use light, controlled Sliding Hammer for Expert Tibia Nail - Suprapatellar Insertion (**7-112-21**) blows to seat the nail. Thread the Hammer Guide Shaft for Expert Tibia Nail - Suprapatellar Insertion (**7-112-22**) into the insertion handle along with the Nut for Hammer Guide Shaft (**7-112-23**) and secure it, using the 11 mm combination wrench. Lock the head of the hammer in place by tightening the nut onto the threads located below the hammer head, using the 4.5 mm pin wrench. Strike the connector directly.

Optionally, the hammer guide can be threaded into the connector and the hammer can be used as a slide hammer. The hammer guide helps to assure the driving cap is struck optimally. Loosen the nut from the threads located below the hammer head and secure onto the threads located above the handle.



3. Check proximal nail position

Attach the aiming arm and insert a 3.2 mm guide wire through the hole as shown in the illustration.

The tip of the guide wire indicates the exact proximal position of the tibial nail.

Remove the driving cap.

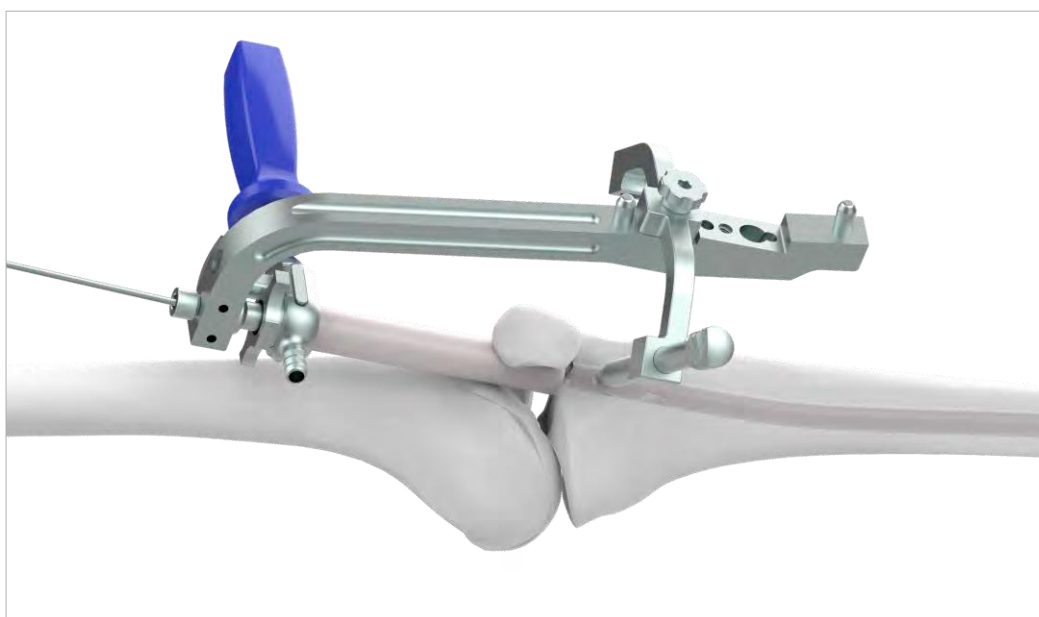
Remove the aiming arm, unless proximal locking is the next step.

- Check proximal nail position under image intensifier control in the lateral view.

Note:

The distance between the markings on the insertion handle is 5 mm and corresponds to the extensions of the end caps. This feature can be used for overinsertion of the nail or for correcting the nail location within the medullary canal.

If primary compression or secondary dynamization is planned, it is recommended to overinsert the nail by more than 7 mm, which corresponds to the maximum distance between the positions in static and dynamic modes.



4. Check distal nail position

Check final nail position under image intensifier control in AP and lateral views.

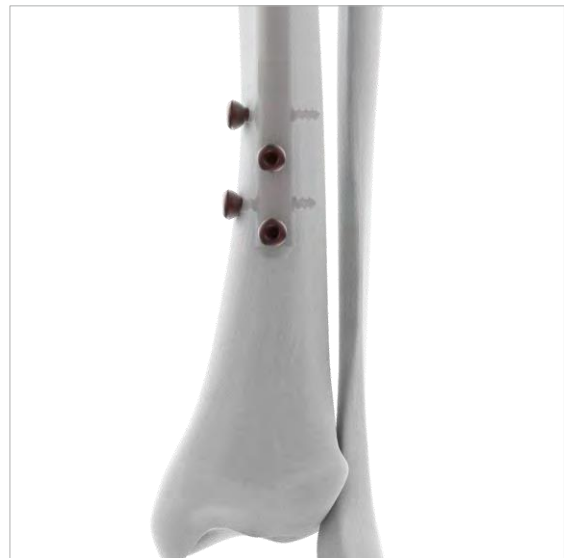
Remove the remaining rod.

Distal Locking

1. Determine instrumentation

Use the appropriate locking screws and drill bit for the nail diameter selected.

Locking of the tibial nail is usually performed from the medial side. The knee must be in extension during nail locking. This position helps counteract the forces exerted by the quadriceps muscle that would tend to deform the proximal fragment and also facilitates rotational control of the tibial axis before locking.



2. Align image

- Check the reduction, correct alignment of the fragments, and leg length before locking the nail.
- Align the C-arm with the hole in the nail closest to the fracture until a perfect circle is visible in the center of the screen. (Distal ML hole shown in illustration).

3. Determine incision point

Mount the Distal Aiming Device (7-112-43) over the insertion handle and secure it with Bolt for Distal Targeting Device (7-112-13). Place a guide wire on the skin over the centre of the hole to mark the incision point and make a stab incision. Position the nail with the help of Positioning rod (7-112-10) . Mount and secure the Stabilizing device (7-112-11) over the Distal targeting arm to secure and lock the nail in-position.



4. Drill

- Using the radiolucent drive under image intensifier. Mount the distal aiming arm (7-112-12) over the mounted distal aiming device (7-112-43) and secure it with bolt for distal aiming device (7-112-45).
- In place the protection sleeve (7-112-49) into the guide of the distal aiming arm (7-112-12). Insert the drill sleeve (7-112-51) and drill bit (7-112-52) into the protection sleeve and drill through both cortices. The drill bit should almost completely fill the circle of the locking hole.

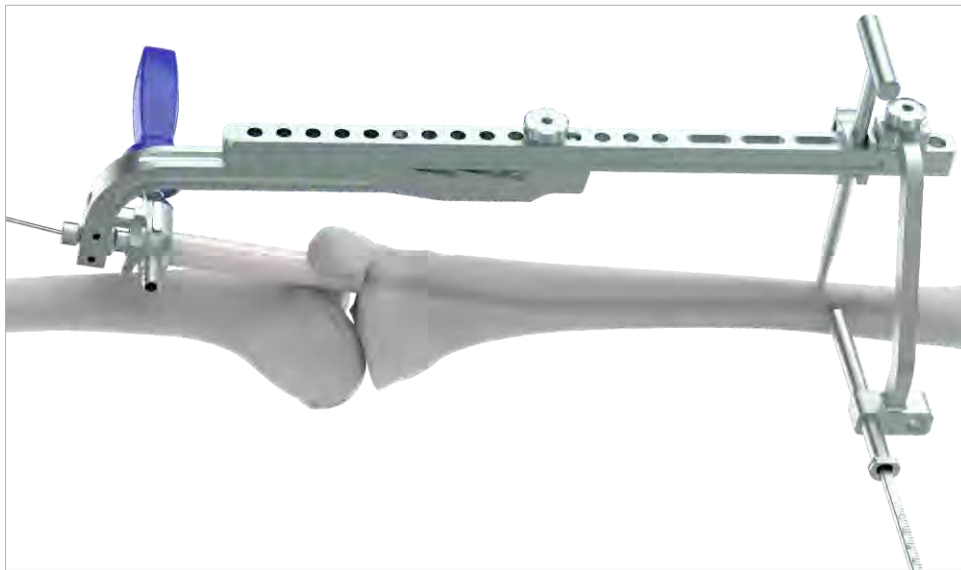


5. Determine locking screw length

Stop drilling immediately after both cortices and disassemble the drill bit from the radiolucent drive.

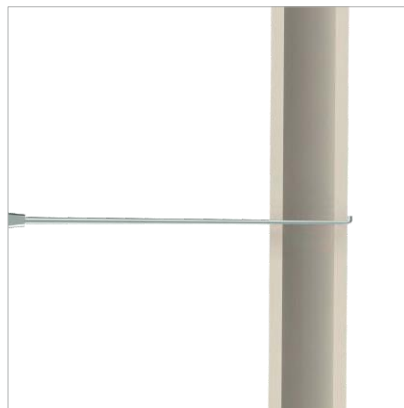
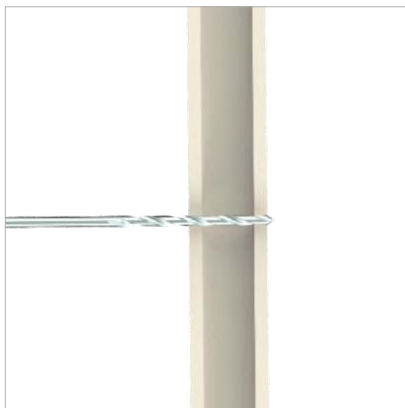
Under image intensifier control, ensure the correct position of the drill bit beyond the far cortex.

Place the Depth Gauge measuring **(7-112-55)** onto the drill bit. Read the graduation of the measuring device at the end of the drill bit. This corresponds to the appropriate locking screw length.



Measure the locking screw length using the depth gauge for locking screws. Ensure the outer sleeve is in contact with the bone and the hook grasps the far cortex.

Read the locking screw length directly from the depth gauge at the back of the outer sleeve.



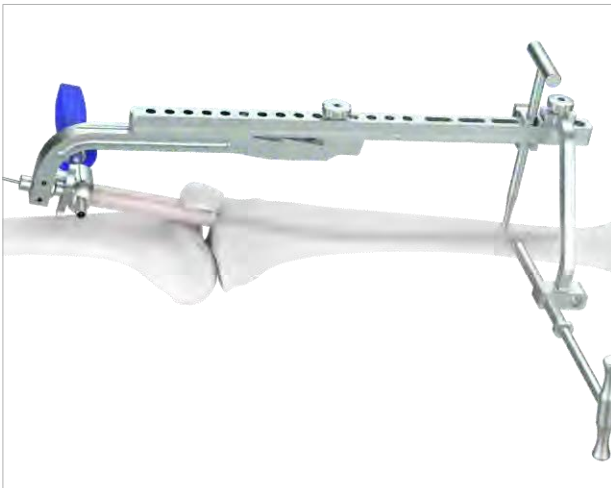
Insert Locking Screw

Insert the appropriate length locking screw using the Screwdriver with T-Handle (7-112-56) Screwdriver and the holding sleeve with locking device, if needed.

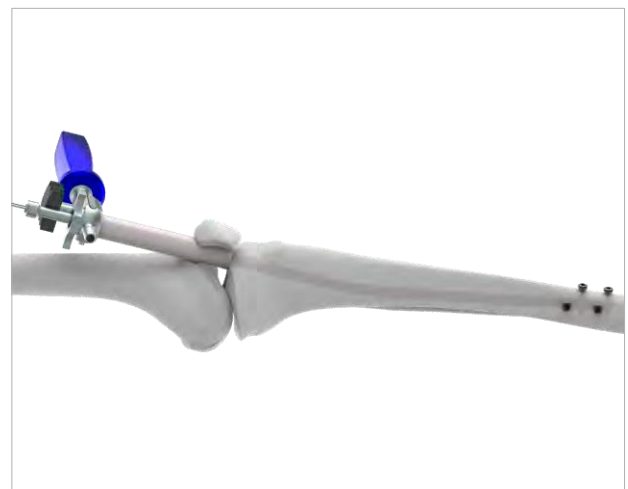
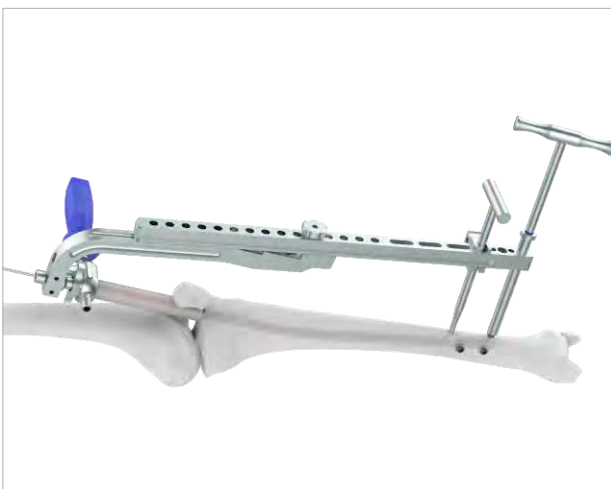
Verify locking screw length under image intensifier control. If needed, a second locking screw may be inserted using the same technique.

Note:

If compression is desired, the backstroke technique with the hammer guide attached to the connector and insertion handle, light reverse hammer blows may be used to compress the fracture; monitor reduction radiographically. If the nail is overinserted, secure the hammer guide to the driving cap and use the slide hammer. Do not strike directly on the bottom of the insertion handle as this will damage the handle. If using the backstroke technique, distal locking must be performed prior to proximal locking to prevent loss of reduction. Verify the nail has been inserted to the appropriate depth. can be used after insertion of the second distal locking screw. Alternatively, the compression device can be used (refer to section Insert compression device).



ANTERIOR - POSTERIOR DISTAL LOCKING



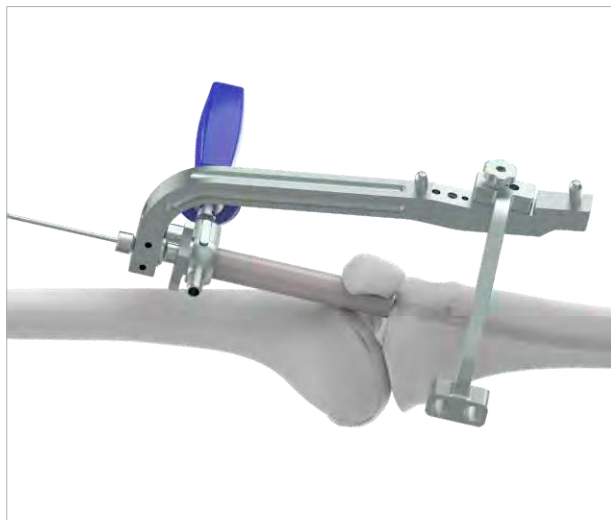
Repeat & follow the steps like drilling, measuring depth as followed in medial to lateral distal locking.

Proximal Locking – Diaphyseal and Distal Segment Fractures

1. Mount aiming arm

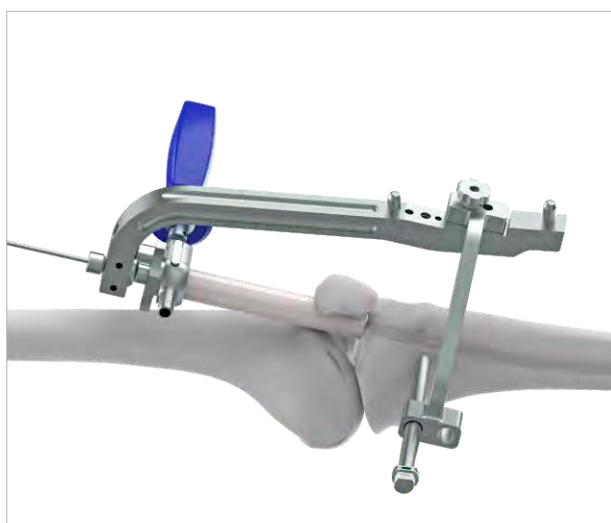
Confirm that the nail is securely connected to the insertion handle
Mount the Proximal Aiming Device (**7-112-07**) for Ø4.4mm Locking Bolt & secure with Bolt for Proximal Aiming Device (**7-112-08**) to the insertion handle.

Note: Do not exert forces on the aiming arm, protection sleeve, drill sleeves and drill bits. These forces may prevent accurate targeting through the proximal locking holes and damage the drill bits.



2. Insert trocar assembly

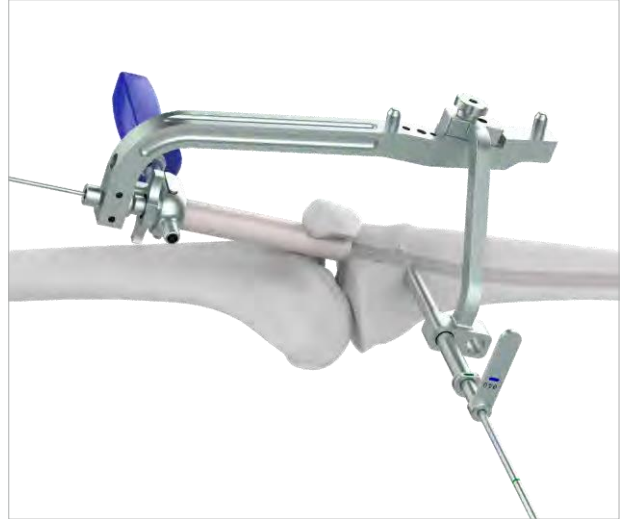
Insert the three-part trocar assembly Protection Drill Sleeve 10/8mm (**7-112-49**), corresponding drill sleeve and Trocar Ø8mm (**7-112-50**) through the desired ML hole in the aiming arm, make a stab incision and insert the trocar to the bone. Remove the trocar.



3. Drill and determine locking screw length

Ensure that the Drill Sleeve 8/4mm for Ø4mm Drill Bit (**7-112-51**) is pressed firmly to the near cortex. Using the corresponding Drill Bit Plain Shank/Jacob Chuck End (**7-112-52**), drill through both cortices until the tip of the drill bit penetrates the far cortex.

Confirm drill bit position.



Ensure that the drill sleeve is pressed firmly to the near cortex and read the measurement from the calibrated drill bit at the back of the drill sleeve. This measurement corresponds to the appropriate length locking screw. Remove the drill bit and the drill sleeve.

After drilling both cortices, remove the drill bit and the drill sleeve.

Insert the Depth Gauge measuring up to 90mm (**520-041**) into the protection sleeve. Make sure that the hook grasps the far cortex and that the protection sleeve is on the bone.

Read the measurement from the back of the protection sleeve, which indicates the appropriate length locking screw.



4. Insert locking screw

Insert the appropriate length locking screw through the protection sleeve using the Screwdriver with T-Handle, Hex 3.5mm (**7-112-56**) screwdriver. Verify locking screw length under image intensifier control. The tip of the locking screw should not project more than 1-2 mm beyond the far cortex.

Repeat the steps 3 to 5 for the second proximal ML locking screw.

Note: Additional cancellous bone locking screw can be added for proximal fractures and highly unstable fractures.



Proximal Locking – Compression Locking Mode (Optional)

1. Compression locking mode

If the fracture gap needs compression after nail insertion, it can be accomplished without removing the insertion instruments.

The Expert Tibial Nail allows a maximum compression of 7 mm. If more compression of the fracture gap is needed, the conventional backstroke technique.

Distal locking is required prior to compression locking

Insert one proximal locking screw in the dynamic locking hole (DYNAM). For details on inserting this locking screw, refer to section Diaphyseal and Distal Segment Fractures.



2. Insert compression device

If the fracture gap needs compression after nail insertion, it can be accomplished without removing the insertion instruments.

The Expert Tibial Nail allows a maximum compression of 7 mm. If more compression of the fracture gap is needed, the conventional backstroke technique.

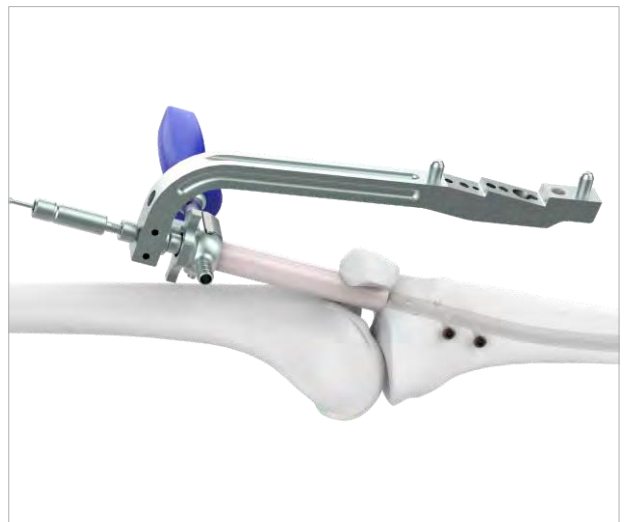
Note:

Backstroke technique: with the hammer guide attached to the connector and insertion handle, light reverse hammer blows may be used to compress the fracture; monitor reduction radiographically. If the nail is overinserted, secure the hammer guide to the driving cap and use the slide hammer. Do not strike directly on the bottom of the insertion handle as this will damage the handle. If using the backstroke technique, distal locking must be performed prior to proximal locking to prevent loss of reduction. Verify the nail has been inserted to the appropriate depth.

Distal locking is required prior to compression locking.

Insert the compression device (**7-112-16**) into the nail through the insertion handle and compress the screw from top to bottom in the nail slot.

Insert one proximal locking screw in the dynamic locking hole (DYNAM). For details on inserting this locking screw, refer to section Diaphyseal and Distal Segment Fractures.



3. Monitor fracture

Control the fracture gap before, during, and after the compression procedure.

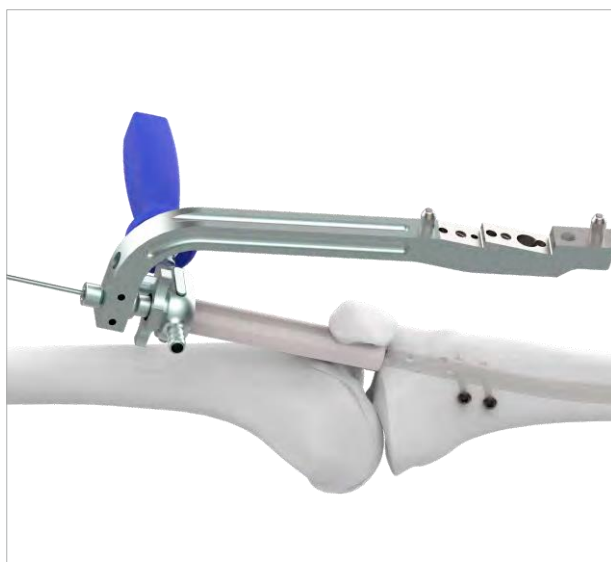


4. Insert static locking screw

Insert second proximal locking screw in the most distal hole of the proximal locking options (Static 1). Refer to section Diaphyseal and Distal Segment Fractures

Remove the compression device.

Additional oblique cancellous bone locking screw can be inserted if required. Refer to section Proximal Segment Fractures.



Proximal Locking – Proximal Segment Fractures

1. Oblique proximal locking

Proximal locking is performed with the knee in extension when using the suprapatellar technique. This neutralizes the deforming forces on proximal fragments caused by the quadriceps mechanism and relieves the pressure on the soft tissue usually associated with tibial nail insertion instruments. This position also facilitates assessment of rotational alignment prior to locking.

Note: When locking with the leg in full extension, it is recommended to use the insertion handle for Expert Tibial Nail and cannulated connecting screw to prevent impingement on the patella. These devices are not compatible with the compression device.

The aiming arm can target all three proximal oblique locking options:

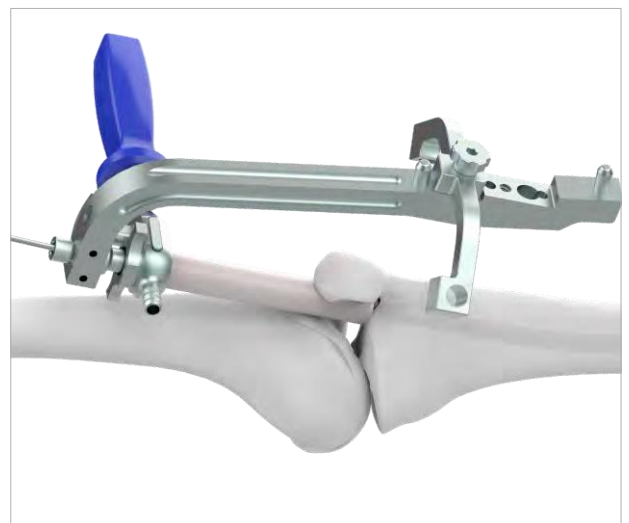
- 1 The oblique locking option (PROXIMAL OBLIQUE) corresponds to the most proximal locking position. Inserting a tibial nail end cap with this locking screw will create a fixed-angle construct.
- 2 The oblique locking option (DISTAL OBLIQUE) corresponds to the second proximal locking position.
- 3 The oblique locking option in anteroposterior direction (A/P) corresponds to the third proximal locking position.



2. Mount aiming arm

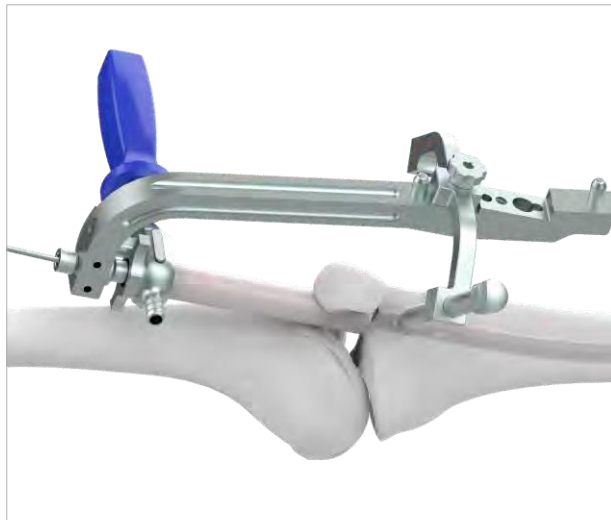
Confirm that the nail is securely connected to the insertion handle using the screwdriver. Mount the Proximal Aiming Device for Ø4.8mm Locking Bolt (7-112-09) to the insertion handle & secure it with the Bolt for Proximal Aiming Device (7-112-08) as shown in the illustration.

Note: Do not exert forces on the aiming arm, protection sleeve, drill sleeves and drill bits. These forces may prevent accurate targeting through the proximal locking holes and damage the drill bits.



3. Insert trocar assembly

Insert the three-part trocar assembly (Protection Sleeve 11/8.6mm (7-112-57), Drill Sleeve 8.5/3.2mm for Ø3.2mm (7-112-58), Trocar Ø3.2mm (7-112-59) through the desired hole for oblique locking options in the aiming arm, make a stab incision and insert the trocar to the bone. Remove the trocar.



4. Drill and determine dual core locking screw length

Ensure that the drill sleeve is pressed firmly to the near cortex.

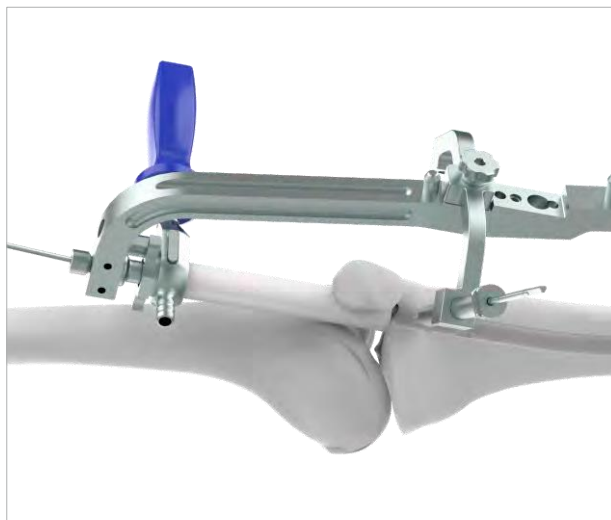
Insert the calibrated Drill Bit Plain Shank/Jacob Chuck End Ø3.2mm (7-112-60) and start drilling the near cortex.

Precaution: Stop drilling immediately after penetrating the near cortex.

DO NOT penetrate the far cortex.

Monitor the position of the drill bit with the image intensifier. This can be done by orienting the image intensifier perpendicular to the drill bit.

Drill to the desired depth. A long dual core locking screw will achieve better bone purchase than a shorter dual core locking screw.



Precaution: Do not perforate the far cortex with the drill bit. Do not damage the tibial plateau.

- Confirm drill bit position after drilling.

Ensure that the drill sleeve is pressed firmly to the bone and read the measurement from the Depth Gauge measuring (520-041) at the back of the drill sleeve.

This measurement indicates the appropriate length of the dual core locking screw.

Remove the drill bit and the drill sleeve.

Precaution: To avoid perforation of the far cortex with the dual core locking screw, a dual core locking screw 5 mm shorter than the measured length is recommended.



5. Insert cancellous bone locking screw

Insert the appropriate 4.8 mm dual core locking screw through the protection sleeve, using the Screwdriver with T-Handle, Hex 3.5mm (7-112-56) .

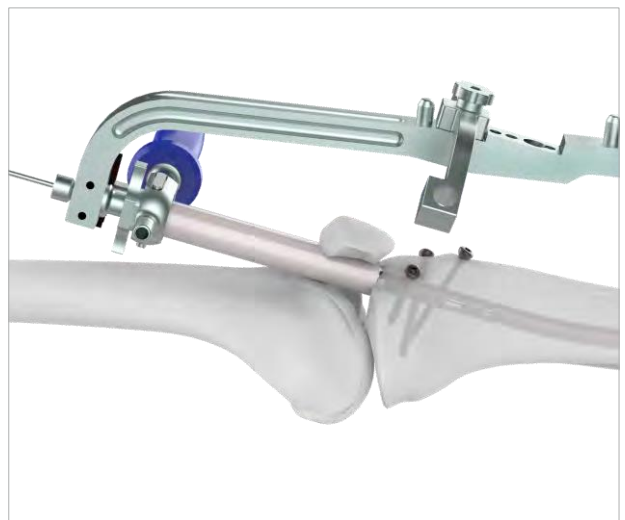
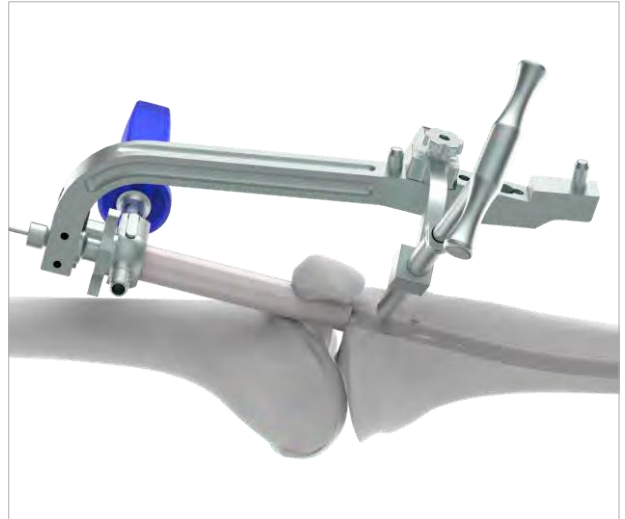
Do not overtighten.

- Verify locking screw length under image intensifier control.

Repeat this procedure for the second dual core locking screw.

If required, repeat the steps described above for the third proximal dual core locking screw in the AP direction.

The position of the dual core locking screw should be controlled with the image intensifier to ensure a correct position of the AP dual core locking screw.



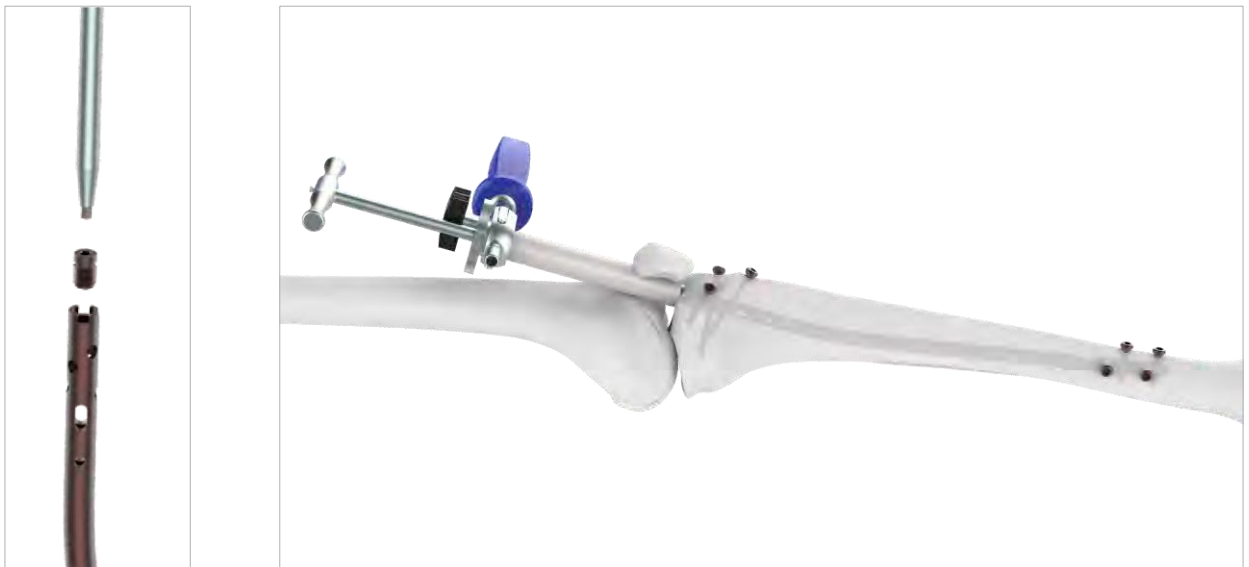
End Cap Insertion

End Cap insertion: In order to prevent tissue growth inside the nail, end cap insertion is required. The insertion handle is detached from the nail and using the Screwdriver with T-Handle, Hex 3.5mm (**7-112-56**), advance the end cap into the nail.

All titanium end caps for Expert Tibial Nails are available in extension lengths of 0 mm, 5 mm, 10 mm, and 15 mm. They prevent bone ingrowth into the nail and they extend the nail height if it is overinserted. The gold end caps lock the proximal oblique screw providing a stable fixed-angle construct.

Remove the connecting screw. The insertion handle can remain in place to help align the end cap to the top of the nail. The end cap fits through the barrel of the insertion handle.

Alternatively, remove the connecting screw and insertion handle. Reinsert the inner protection sleeve to open the cannula through the outer protection sleeve.



Alternative instruments

The end caps are cannulated and can be used over a guide wire with the cannulated screwdriver.

Engage the end cap with the cannulated screwdriver, inter-lock. To prevent cross threading, align the end cap with the nail axis and turn the end cap counterclockwise, until the thread of the end cap aligns with that of the nail.

Turn the end cap clockwise to thread the end cap into the nail. Remove the guide wire and screwdriver.



Implant Removal

In case of implant removal firstly remove the end cap with the help of 3.5mm Hex screwdriver. Proceed by removing both Ø4.4mm and Ø4.8mm Locking Bolt from the bone using 3.5mm Hex screwdriver. Attach the connecting shaft **(520-019)** to the open end of nail from where the end cap is removed.



On top of connecting shaft attach the Hammer guide shaft **(520-022)** followed by screwing the nut for hammer guide shaft **(520-023)** on top of hammer guide shaft. Unlock the nut on the sliding hammer **(520-024)** for its free movement during nail removal. Now, slide the Sliding Hammer into the hammer guide shaft. Strike the hammer in upward direction to remove the nail from the bone.



Note: It is highly recommended not to remove all the locking bolt as it may cause the nail rotation during attachment of the connecting shaft to the nail. Remove the remaining Locking bolt after the connecting shaft and the hammer guide shaft has been attached.

T

**Nail Instrument Set
(Suprapatellar Insertion)**

7-112-01

Insertion Handle for Expert Tibia Nail - Suprapatellar Insertion



7-112-02

Protection Sleeve Handle for Expert Tibia Nail - Suprapatellar Insertion



7-112-03

Outer Protection Sleeve for Expert Tibia Nail - Suprapatellar Insertion



7-112-04

Protection Sleeve 16/14.5mm for Expert Tibia Nail - Suprapatellar Insertion



7-112-05

Trocar Ø14.5mm, PEEK, for Expert Tibia Nail - Suprapatellar Insertion



7-112-06

Centering Sleeve 14.5/3.2mm for Expert Tibia Nail - Suprapatellar Insertion



7-112-07

Proximal Aiming Device for Ø4.4mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)



7-112-08

Bolt for Proximal Aiming Device - Expert Tibia Nail (Suprapatellar Insertion)



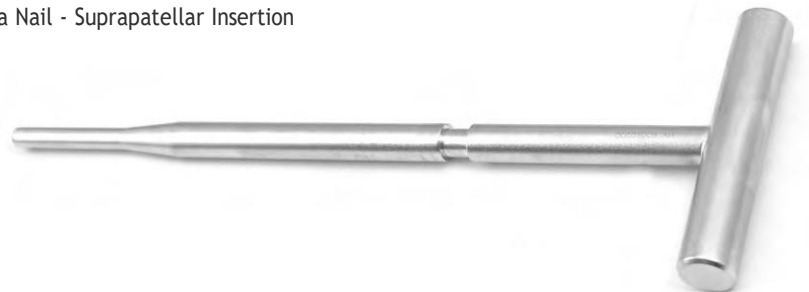
7-112-09

Proximal Aiming Device for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)



7-112-10

Positioning Rod For Expert Tibia Nail - Suprapatellar Insertion



7-112-11

Stabilizing Device for Expert Tibia Nail - Suprapatellar Insertion



7-112-12

Distal Aiming Arm for Expert Tibia Nail - Suprapatellar Insertion



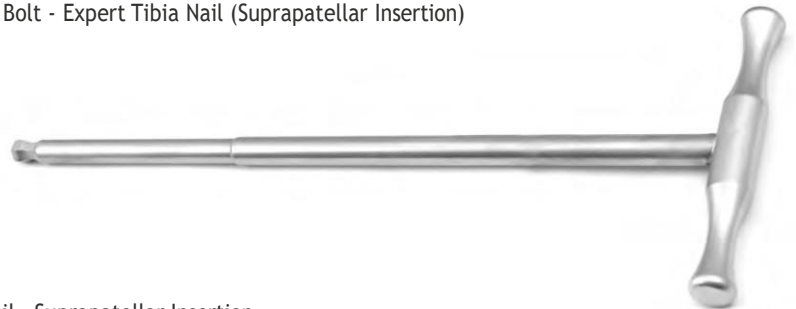
7-112-13

Bolt for Distal Targeting Device, for Expert Tibia Nail - Suprapatellar Insertion



7-112-14

Universal Driver for Nail Holding Bolt - Expert Tibia Nail (Suprapatellar Insertion)



7-112-15

Entry Reamer for Expert Tibia Nail - Suprapatellar Insertion



7-112-16

Compression Device for Expert Tibia Nail - Suprapatellar Insertion



7-112-17

Extraction Screw for Expert Tibia Nail - Suprapatellar Insertion



7-112-18

Connecting Shaft for Expert Tibia Nail - Suprapatellar Insertion



7-112-19 Nail Holding Bolt, Long, for Expert Tibia Nail - Suprapatellar Insertion



7-112-20 Combination Wrench 11mm for Expert Tibia Nail - Suprapatellar Insertion



7-112-21 Sliding Hammer for Expert Tibia Nail - Suprapatellar Insertion



7-112-22 Hammer Guide Shaft for Expert Tibia Nail - Suprapatellar Insertion



7-112-23 Nut for Hammer Guide Shaft - Expert Tibia Nail - Suprapatellar Insertion



7-112-24 Radiographic Ruler for Expert Tibia Nail - Suprapatellar Insertion



520-004

Guide Wire With Threaded Tip \varnothing 3.2mm x Thread Length 10mm x Length 300mm



7-112-25

Entry Cutter for Expert Tibia Nail - Suprapatellar Insertion



7-112-26

Quick Coupling T Handle for Expert Tibia Nail - Suprapatellar Insertion



7-112-27

Cannulated Awl for Expert Tibia Nail - Suprapatellar Insertion



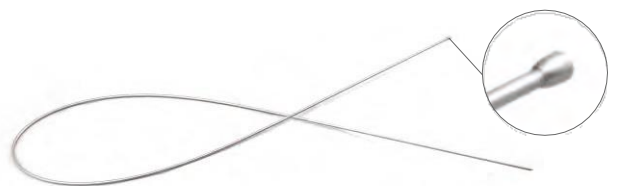
7-112-28

Reduction Device for Expert Tibia Nail - Suprapatellar Insertion



520-013

Guide wire with Ball Tip \varnothing 2.5/3.65mm x Length 1000mm - Nitinol, for Expert Tibia Nail



520-058

Guide wire without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Tibia Nail



7-112-29

Guide Wire Holder for Expert Tibia Nail - Suprapatellar Insertion



7-112-30

Flexible Reamer Shaft (Jacob Connection) for Expert Tibia Nail - Suprapatellar Insertion



Reamer Head

Code	Dia	Code	Dia
7-112-31	Ø7.5mm	7-112-37	Ø10.5mm
7-112-32	Ø8mm	7-112-38	Ø11mm
7-112-33	Ø8.5mm	7-112-39	Ø11.5mm
7-112-34	Ø9mm	7-112-40	Ø12mm
7-112-35	Ø9.5mm	7-112-41	Ø12.5mm
7-112-36	Ø10mm	7-112-42	Ø13mm



7-112-43

Distal Aiming Device for Expert Tibia Nail - Suprapatellar Insertion



7-112-44

Ø5.2mm T-Handle Drill Bit with Flat End for Expert Tibia Nail - Suprapatellar Insertion



7-112-45 Bolt for Distal Aiming Arm - Expert Tibia Nail (Suprapatellar Insertion)



7-112-46 Allen Key, Hex 5mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-47 Drill Sleeve, Ø5.2mm for Positioning Rod - Expert Tibia Nail (Suprapatellar Insertion)



7-112-48 Drill Bit Plain Shank/ Jacob Chuck End Ø5.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-49 Protection Drill Sleeve 10/8mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-50 Trocar Ø8mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-51

Drill Sleeve 8/4mm for Ø4mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)



7-112-52

Drill Bit Plain Shank/Jacob Chuck End Ø4.0mm x Length 300mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-53

Stopper for Ø4.0mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)



7-112-54

Allen Key, Hex 3mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-55

Depth Gauge measuring upto 90mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-56

Screwdriver with T-Handle, Hex 3.5mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-57 Protection Sleeve 11/8.6mm for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)



7-112-58 Drill Sleeve 8.5/3.2mm for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)



7-112-59 Trocar Ø3.2mm for Expert Tibia Nail (Suprapatellar Insertion)



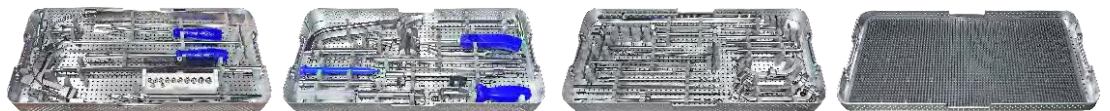
7-112-60 Drill Bit Plain Shank/Jacob Chuck End Ø3.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-61 Stopper for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)



7-112-62 Instrument Trays for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)



7-112-63 Container with PPSU lid for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)



7-112 Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)



7-112 Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)

Code	Set Consisting of	Units
7-112-01	Insertion Handle for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-02	Protection Sleeve Handle for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-03	Outer Protection Sleeve for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-04	Protection Sleeve 16/14.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-05	Trocar Ø14.5mm, PEEK, for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-06	Centering Sleeve 14.5/3.2mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-07	Proximal Aiming Device for Ø4.4mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-08	Bolt for Proximal Aiming Device - Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-09	Proximal Aiming Device for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-10	Positioning Rod For Expert Tibia Nail - Suprapatellar Insertion	1
7-112-11	Stabilizing Device for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-12	Distal Aiming Arm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-13	Bolt for Distal Targeting Device, for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-14	Universal Driver for Nail Holding Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-15	Entry Reamer for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-16	Compression Device for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-17	Extraction Screw for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-18	Connecting Shaft for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-19	Nail Holding Bolt, Long, for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-20	Combination Wrench 11mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-21	Sliding Hammer for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-22	Hammer Guide Shaft for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-23	Nut for Hammer Guide Shaft - Expert Tibia Nail - Suprapatellar Insertion	1
7-112-24	Radiographic Ruler for Expert Tibia Nail - Suprapatellar Insertion	1
520-004	Guide Wire With Threaded Tip Ø3.2mm x Thread Length 10mm x Length 300mm	3
7-112-25	Entry Cutter for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-26	Quick Coupling T Handle for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-27	Cannulated Awl for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-28	Reduction Device for Expert Tibia Nail - Suprapatellar Insertion	1
520-013	Guide wire with Ball Tip Ø2.5/3.65mm x Length 1000mm - Nitinol, for Expert Tibia Nail	1
520-058	Guide wire without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Tibia Nail	1
7-112-29	Guide Wire Holder for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-30	Flexible Reamer Shaft (Jacob Connection) for Expert Tibia Nail - Suprapatellar Insertion	2

Code	Set Consisting of	Units
7-112-31	Reamer Head, Ø7.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-32	Reamer Head, Ø8.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-33	Reamer Head, Ø8.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-34	Reamer Head, Ø9.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-35	Reamer Head, Ø9.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-36	Reamer Head, Ø10.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-37	Reamer Head, Ø10.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-38	Reamer Head, Ø11.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-39	Reamer Head, Ø11.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-40	Reamer Head, Ø12.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-41	Reamer Head, Ø12.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-42	Reamer Head, Ø13.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-43	Distal Aiming Device for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-44	Ø5.2mm T-Handle Drill Bit with Flat End for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-45	Bolt for Distal Aiming Arm - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-46	Allen Key, Hex 5mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-47	Drill Sleeve, Ø5.2mm for Positioning Rod - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-48	Drill Bit Plain Shank/ Jacob Chuck End Ø5.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-49	Protection Drill Sleeve 10/8mm for Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-50	Trocar Ø8mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-51	Drill Sleeve 8/4mm for Ø4mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-52	Drill Bit Plain Shank/ Jacob Chuck End Ø4.0mm x Length 300mm for Expert Tibia Nail (Suprapatellar Insertion)	3
7-112-53	Stopper for Ø4.0mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-54	Allen Key, Hex 3mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-55	Depth Gauge measuring upto 90mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-56	Screwdriver with T-Handle, Hex 3.5mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-57	Protection Sleeve 11/8.6mm for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-58	Drill Sleeve 8.5/3.2mm for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-59	Trocar Ø3.2mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-60	Drill Bit Plain Shank/ Jacob Chuck End Ø3.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-61	Stopper for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-62	Instrument Trays for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)	3
7-112-63	Container with PPSU lid for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)	1



Surgical Technique

Expert Tibia Nailing System

INTRODUCTION

The Expert Tibial Nail enables the surgeon to further extend the spectrum of fractures eligible for intramedullary nailing. This nail is indicated for fractures of metaphyseal and certain intra articular fractures of tibial head and pilon tibial Expert Tibia Nail enhances the stability of constructed bone-nail and reduces the risk for secondary malalignment. Multidirectional interlocking screws ensure that alignment can be well maintained and stability preserved in short proximal or distal tibial segments. The end cap achieves angular stability between the proximal oblique screw and nail.



INDICATIONS:

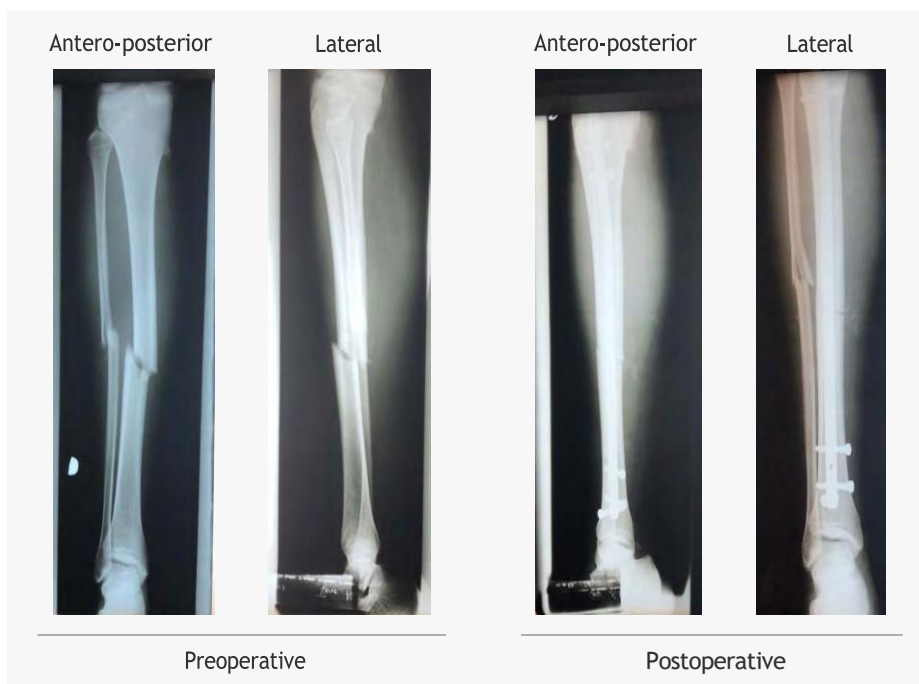
The AUXEIN MEDICAL Expert Tibia nail is indicated for use in a variety of tibial fractures, such as:

- 41-A2/A3
- All shaft fractures
- 43-A1/A2/A3
- Combinations of these fractures

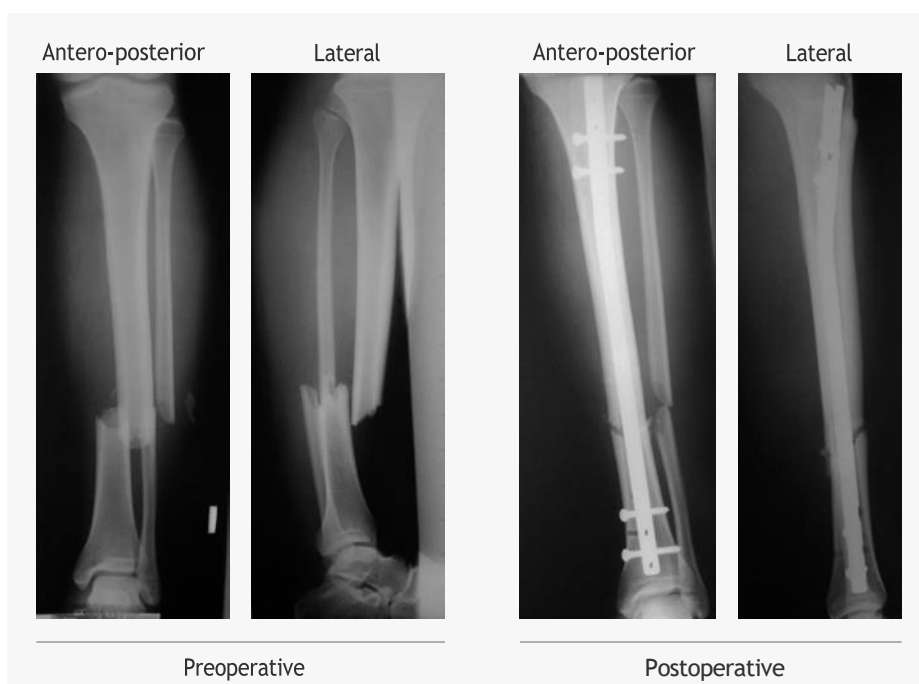


CASES

CASE-1

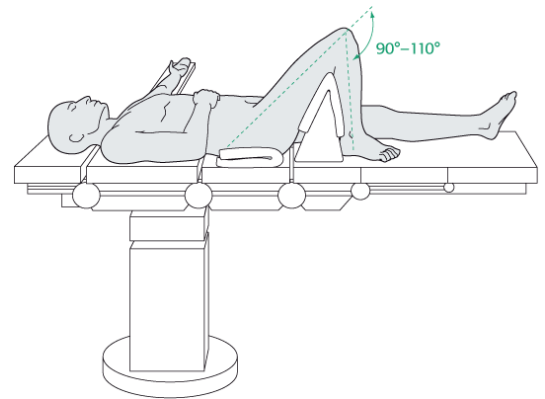


CASE-2



Patient Positioning: The patient is placed in a supine position. For entry site access, a knee flexion of around 90-110 degrees is required.

The angle can be achieved by placing a foam triangle under the knee. While providing the support, care should be taken that it should not press the popliteal fossa to avoid neurovascular compression and allowing better knee flexion.



Measuring Nail length and diameter:

The C-Arm is positioned in such a way to get AP view of the Distal Tibia. The Radiographic ruler (**520-003**) is held parallel to the Tibia bone. The ruler is adjusted until the distal end of ruler is aligned with the desired nail insertion depth.

After finalizing the position of radiographic ruler, the C-Arm is moved to the Proximal Tibia to take an image in AP view. The length of the nail is determined from reading on the ruler pointing in level or just below the tibial plateau.

Under C-Arm, the diameter gauge part of the radiographic ruler is placed over the narrowest part of the Tibia medullary canal in either AP or lateral view. The reading on the diameter gauge coinciding with the canal width is chosen.

Note: All the readings are to be taken only after the compression of the bone has been achieved. As an alternative, these readings can be measured from the uninjured Tibia bone.

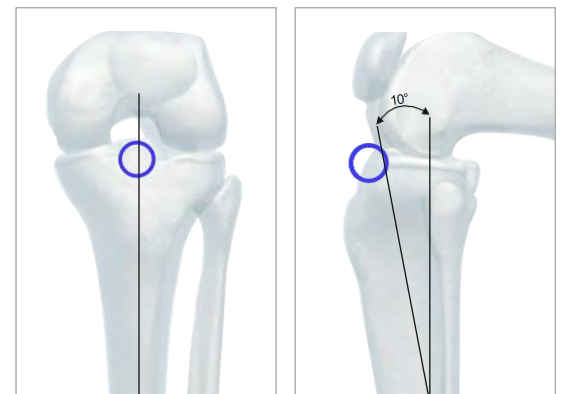


Skin Incision: The skin incision is made in line with center of medullary axis starting proximally at the distal third of the patella down to the tibial tuberosity along the patellar ligament.

Entry point determination: It is important to define the entry point for correct insertion of the expert tibia nail.

The insertion point is determined in both AP and lateral views as below:

- In lateral view, the point is at the ventral edge of tibial plateau.
- In AP view, the point is in line with intramedullary canal axis and with lateral tubercle of the inter-condylar eminence.



Guide wire insertion: The 3.2 mm guide wire (520-004) is secured in the guide wire holder (520-005). A punch mark is made at the insertion point at an angle of 10° to the tibial shaft axis in the lateral view. The guide wire is inserted 8-10 cm deep. The position of guide wire is finalized under the C-arm in both AP and lateral view.

Precaution: It is advised to dispose of the guide wire after the use and not to reuse it.



Opening the medullary canal:

There are 3 different alternatives for opening the medullary canal as shown below:

- 1. Using Entry cutter:** The Protection sleeve (520-006) along with the entry cutter (520-007) are placed over the guide wire and the medullary canal is opened to a depth of 8-10 cm. Care should be taken that the cutter and guide wire doesn't touch the posterior cortex. The entry cutter and the guide wire are finally removed along with the protection sleeve.



- 2. Using Cannulated Awl:** The cannulated awl (520-009) is placed over the guide wire and the medullary canal is opened. The twisting motion is applied to the awl and a cannulation of 8-10 cm is created in the medullary canal. Care should be taken that the awl doesn't touch the posterior cortex. The cannulated awl and the guide wire are finally removed.



3. Using entry reamer: The entry reamer (**520-010**) along with the protection sleeve (**520-006**) is placed over the guide wire and the medullary canal is opened to a depth of 8-10 cm. Care should be taken that the entry reamer and guide wire doesn't touch the posterior cortex. The entry reamer and the guide wire along with the protection sleeve are finally removed.



Reaming the Medullary Canal: Prior to reaming, the fractured segment of bone is put back in place by inserting the Reduction device (**520-12**) into the tibial medullary canal and the Ø2.5mm guide wire with ball tip (**520-058**) is inserted through the Reduction device (**520-012**) into the medullary canal. The Flexible reamer shaft (**520-014**) is then attached to the Reamer Head (**520-7.5 to 520-13.0**) of suitable diameter. The Tibia will be reamed to a diameter 0.5 to 1.5mm larger than the selected Tibia Nail. The reaming will be performed in 0.5mm increments. Continue reaming with to and fro motion to clear debris from medullary canal.



Jig Assembly: Align the Nail to the insertion Handle (**520-15**) so that the notch on insertion handle matches with the one on nail. Insert the nail holding bolt (**520-016**) through the insertion handle into the nail and tighten with the help of Driver for Nail holding bolt (**50-053**) to secure the assembly.



Nail Insertion: The assembly is advanced over the guide wire through the reamed intramedullary canal. Use twisting motion for further insertion. The nail insertion is controlled under image intensifier in both AP and lateral view to avoid misalignment.



If it is difficult to insert the nail manually into the medullary canal then slide the block for connecting shaft **(520-018)** into the grooves on top of insertion handle and secure it in place by threading the connecting shaft **(520-019)** into the block. Apply slight blows with the Sliding hammer **(520-024)** on top of the connecting shaft to advance the nail into medullary canal for final seating.

Alternatively, the Hammer Guide shaft **(520-022)** can be threaded on top of connecting shaft. Hence, the Sliding hammer can glide over the hammer guide shaft and with slight blows the nail can be finally seated into the medullary canal.

Confirm the final nail position radiographically under the C-arm.

Notes:

- If it is difficult to insert the nail, ream the intramedullary canal to a larger diameter or use a smaller diameter nail.
- After hammering confirm that the nail should be securely connected to the insertion handle.
- It is highly advised not to strike the insertion handle directly.



Locking Options:

Proximal Segment Fractures: For proximal fractures it is recommended to lock nail with the knee in extension. This neutralizes the deforming forces on proximal fragments caused by the quadriceps mechanism, and relieves the pressure on the soft tissue usually associated with tibial nail insertion instruments. This position also facilitates assessment of rotational alignment prior to locking.

Diaphyseal Segment Fractures: For diaphyseal fractures, it is recommended to lock distally first to allow intraoperative compression.

Distal Fragment Fractures: For distal fractures, it is recommended to lock distally first to facilitate reduction.



Distal Locking:

For distal locking, the Distal aiming device (**520-025**) is attached to the insertion handle. The arrow on insertion handle is aligned with the arrow indicating the selected nail length on the distal aiming device and is secure in place by using the bolt for distal aiming device (**520-026**). The Distal Aiming arm (**520-033**) is then attached to the distal aiming device and secured using bolt for distal aiming arm (**520-034**).



Nail repositioning: Pass the Ø5.2mm Drill sleeve (**520-028**) through the hole in the Distal aiming device for the positioning rod and advance it until it sits flush with the bone. Through the drill sleeve pass the Ø5.2mm Drill with T-Handle (**520-030**) until it reaches the slot on the nail. Remove drill bit and drill sleeve. Through the positioning rod hole insert the positioning rod (**520-031**) and secure it in place using the stabilizing device (**520-032**).



Inserting Distal Medio-lateral screw:

The green Trocar assembly [Protection drill sleeve 10/8.1mm (**520-035**) & Ø8.0mm Trocar (**520-036**)] is passed through the holes in distal aiming arm (**520-033**). A stab incision is made in the skin for passing the trocar assembly. The trocar assembly is advanced through the skin incision until it sits flush with the bone. The trocar is removed.



Insert the Drills sleeve 8/4mm (**520-037**) into protection sleeve. The Ø4.0mm Drill bit (**520-038**) is inserted through the drill sleeve and the bone is drilled through both cortices. Remove the Drill bit and drill sleeve.



Insert the Screw measuring gauge (**520-041**) through the protection sleeve and note down the required Ø4.4mm Locking bolt length as per the marking on the measuring gauge.



Select the Ø4.4mm Locking bolt of predetermined length and insert into the predrilled hole using the Screwdriver with T-handle **(520-059)**. Disassemble and remove the Distal Aiming arm along with the protection sleeve.



Inserting Distal Anteroposterior screw:

If required, the remaining distal anteroposterior Ø4.4mm distal locking bolt can be inserted through the holes in the distal aiming device **(520-025)**. The procedure for drilling and screw insertion would be same as described in the Inserting Distal mediolateral screw procedure.



Proximal Locking: At proximal end of nail there are three different options for locking:

- 1. Dynamic Locking:** In order to achieve reduction in the bone shaft, the dynamic locking method is suitable. The dynamic locking could be achieved using the Proximal Aiming device for Ø4.4mm Locking bolt **(520-044)**. Attach the proximal aiming device to the insertion handle and hold it in place with the help of bolt for proximal aiming device **(520-045)**. The green trocar assembly is now inserted through the proximal hole of the aiming arm coinciding with the dynamic hole of the nail and is advanced until it sits flush with the bone.



Remove the trocar (**520-036**). The \varnothing 4.0mm Drill bit (**520-038**) is now passed through the Protection sleeve (**520-036**) and used to drill the bone for screw insertion. Remove the drill bit and the drill sleeve.



Using the screw measuring gauge (**520-041**) measure the required \varnothing 4.4mm Locking bolt length through the protection sleeve.



Finally insert the \varnothing 4.4mm Locking bolt of selected length using 3.5mm Hex screwdriver through the protection sleeve.



For dynamization of the fracture, the Compression device for Expert Tibia Nail (520-052) is passed through the insertion handle into the proximal end of nail as shown in the adjacent figure. Using the Driver for nail holding bolt (520-053) insert the compression device further inside the nail. This will push the pre-inserted Locking bolt downwards and hence there will be an upward relative motion of the fractured fragment which will in turn reduce the fracture. Remove the compression device.



2. Static Locking: For static locking pass the green trocar assembly through the distal hole of the proximal aiming arm for Ø4.4mm Locking Bolt (520-044). The method for drilling and screw insertion will be same as mentioned in the dynamic locking.



3. Oblique Locking: The 3 most proximal holes in the nail is designed to accommodate Ø4.8mm Locking bolt in them. For oblique locking, the Proximal aiming device for Ø4.8mm Locking bolt (520-046) is attached to the insertion handle and fixed in place with the help of Bolt for proximal aiming device (520-045). The Yellow trocar assembly [Protection sleeve 11/8.6mm (520-047), Drill sleeve 8.5/3.5mm (520-048) & Ø3.2mm Trocar (520-049)] is inserted through the hole in the proximal aiming device and advanced until it sits flush with the bone. The trocar is removed.



The Ø3.2mm Drill bit (**520-050**) is inserted through the drill sleeve and the bone is drilled. After the drilling has been performed, remove both the drill bit and the drill sleeve.



Insert the screw measuring gauge (**520-041**) through the protection sleeve and the required Ø4.8mm Locking bolt length is measured from the marking on the measuring gauge.



Using the 3.5mm Hex screwdriver, finally insert the Ø4.8mm Locking bolt of predetermined length into the predrilled hole. The two Ø4.8mm Locking bolt can be inserted using the Proximal aiming device for Ø4.8mm locking bolt. The last remaining oblique Ø4.8mm Locking bolt in the A-P direction can be inserted by using the insertion handle as a guide. The yellow trocar assembly is passed through the oblique hole in the insertion handle and the same procedure for drilling and screw insertion is used as described above.



End Cap insertion: In order to prevent tissue growth inside the nail, end cap insertion is required. The insertion handle is detached from the nail and using the 3.5mm Hex screwdriver (**520-042**), advance the end cap into the nail.



Implant Removal:

In case of implant removal firstly remove the end cap with the help of 3.5mm Hex screwdriver. Proceed by removing both Ø4.4mm and Ø4.8mm Locking Bolt from the bone using 3.5mm Hex screwdriver. Attach the connecting shaft (**520-019**) to the open end of nail from where the end cap is removed. On top of connecting shaft attach the Hammer guide shaft (**520-022**) followed by screwing the nut for hammer guide shaft (**520-023**) on top of hammer guide shaft. Unlock the nut on the sliding hammer (**520-024**) for its free movement during nail removal. Now, slide the Sliding Hammer into the hammer guide shaft. Strike the hammer in upward direction to remove the nail from the bone.

Note: It is highly recommended not to remove all the locking bolt as it may cause the nail rotation during attachment of the connecting shaft to the nail. Remove the remaining Locking bolt after the connecting shaft and the hammer guide shaft has been attached.



Expert Tibia Nail

Stainless Steel

	Code	Dia x Length
Ø8mm	520-08-255	Ø8mm x 255mm
	520-08-270	Ø8mm x 270mm
	520-08-285	Ø8mm x 285mm
	520-08-300	Ø8mm x 300mm
	520-08-315	Ø8mm x 315mm
	520-08-330	Ø8mm x 330mm
	520-08-345	Ø8mm x 345mm
	520-08-360	Ø8mm x 360mm
	520-08-375	Ø8mm x 375mm
Ø9mm	520-09-255	Ø9mm x 255mm
	520-09-270	Ø9mm x 270mm
	520-09-285	Ø9mm x 285mm
	520-09-300	Ø9mm x 300mm
	520-09-315	Ø9mm x 315mm
	520-09-330	Ø9mm x 330mm
	520-09-345	Ø9mm x 345mm
	520-09-360	Ø9mm x 360mm
	520-09-375	Ø9mm x 375mm
Ø10mm	520-10-255	Ø10mm x 255mm
	520-10-270	Ø10mm x 270mm
	520-10-285	Ø10mm x 285mm
	520-10-300	Ø10mm x 300mm
	520-10-315	Ø10mm x 315mm
	520-10-330	Ø10mm x 330mm
	520-10-345	Ø10mm x 345mm
	520-10-360	Ø10mm x 360mm
	520-10-375	Ø10mm x 375mm
Ø11mm	520-11-255	Ø11mm x 255mm
	520-11-270	Ø11mm x 270mm
	520-11-285	Ø11mm x 285mm
	520-11-300	Ø11mm x 300mm
	520-11-315	Ø11mm x 315mm
	520-11-330	Ø11mm x 330mm
	520-11-345	Ø11mm x 345mm
	520-11-360	Ø11mm x 360mm
	520-11-375	Ø11mm x 375mm
Ø12mm	520-12-255	Ø12mm x 255mm
	520-12-270	Ø12mm x 270mm
	520-12-285	Ø12mm x 285mm
	520-12-300	Ø12mm x 300mm
	520-12-315	Ø12mm x 315mm
	520-12-330	Ø12mm x 330mm
	520-12-345	Ø12mm x 345mm
	520-12-360	Ø12mm x 360mm
	520-12-375	Ø12mm x 375mm



Titanium

	Code	Dia x Length
Ø8mm	TI-520-08-255	Ø8mm x 255mm
	TI-520-08-270	Ø8mm x 270mm
	TI-520-08-285	Ø8mm x 285mm
	TI-520-08-300	Ø8mm x 300mm
	TI-520-08-315	Ø8mm x 315mm
	TI-520-08-330	Ø8mm x 330mm
	TI-520-08-345	Ø8mm x 345mm
	TI-520-08-360	Ø8mm x 360mm
	TI-520-08-375	Ø8mm x 375mm
Ø9mm	TI-520-09-255	Ø9mm x 255mm
	TI-520-09-270	Ø9mm x 270mm
	TI-520-09-285	Ø9mm x 285mm
	TI-520-09-300	Ø9mm x 300mm
	TI-520-09-315	Ø9mm x 315mm
	TI-520-09-330	Ø9mm x 330mm
	TI-520-09-345	Ø9mm x 345mm
	TI-520-09-360	Ø9mm x 360mm
	TI-520-09-375	Ø9mm x 375mm
Ø10mm	TI-520-10-255	Ø10mm x 255mm
	TI-520-10-270	Ø10mm x 270mm
	TI-520-10-285	Ø10mm x 285mm
	TI-520-10-300	Ø10mm x 300mm
	TI-520-10-315	Ø10mm x 315mm
	TI-520-10-330	Ø10mm x 330mm
	TI-520-10-345	Ø10mm x 345mm
	TI-520-10-360	Ø10mm x 360mm
	TI-520-10-375	Ø10mm x 375mm
Ø11mm	TI-520-11-255	Ø11mm x 255mm
	TI-520-11-270	Ø11mm x 270mm
	TI-520-11-285	Ø11mm x 285mm
	TI-520-11-300	Ø11mm x 300mm
	TI-520-11-315	Ø11mm x 315mm
	TI-520-11-330	Ø11mm x 330mm
	TI-520-11-345	Ø11mm x 345mm
	TI-520-11-360	Ø11mm x 360mm
	TI-520-11-375	Ø11mm x 375mm
Ø12mm	TI-520-12-255	Ø12mm x 255mm
	TI-520-12-270	Ø12mm x 270mm
	TI-520-12-285	Ø12mm x 285mm
	TI-520-12-300	Ø12mm x 300mm
	TI-520-12-315	Ø12mm x 315mm
	TI-520-12-330	Ø12mm x 330mm
	TI-520-12-345	Ø12mm x 345mm
	TI-520-12-360	Ø12mm x 360mm
	TI-520-12-375	Ø12mm x 375mm



End Cap For Expert Tibia Nail



Stainless Steel	Titanium	Length (mm)
520-001	TI-520-001	0
520-001-05	TI-520-001-05	5
520-001-10	TI-520-001-10	10
520-001-15	TI-520-001-15	15

Ø4.8mm Locking Bolt, Self-Tapping, For Expert Tibia Nail



Stainless Steel	Titanium	Length (mm)
520-002-25	TI-520-002-25	25
520-002-30	TI-520-002-30	30
520-002-35	TI-520-002-35	35
520-002-40	TI-520-002-40	40
520-002-45	TI-520-002-45	45
520-002-50	TI-520-002-50	50
520-002-55	TI-520-002-55	55
520-002-60	TI-520-002-60	60
520-002-65	TI-520-002-65	65
520-002-70	TI-520-002-70	70
520-002-75	TI-520-002-75	75
520-002-80	TI-520-002-80	80
520-002-85	TI-520-002-85	85
520-002-90	TI-520-002-90	90

Ø4.4mm Locking Bolt, Self-Tapping, For Expert Tibia Nail



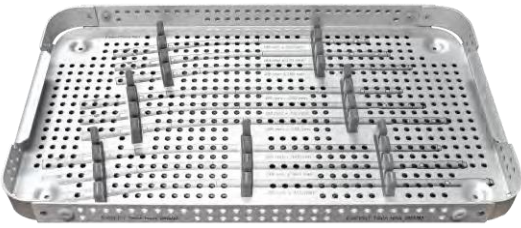
Stainless Steel	Titanium	Length (mm)
520-058-24	TI-520-058-24	24
520-058-26	TI-520-058-26	26
520-058-28	TI-520-058-28	28
520-058-30	TI-520-058-30	30
520-058-32	TI-520-058-32	32
520-058-34	TI-520-058-34	34
520-058-36	TI-520-058-36	36
520-058-38	TI-520-058-38	38
520-058-40	TI-520-058-40	40
520-058-42	TI-520-058-42	42
520-058-44	TI-520-058-44	44
520-058-46	TI-520-058-46	46
520-058-48	TI-520-058-48	48
520-058-50	TI-520-058-50	50
520-058-52	TI-520-058-52	52
520-058-54	TI-520-058-54	54
520-058-56	TI-520-058-56	56
520-058-58	TI-520-058-58	58
520-058-60	TI-520-058-60	60
520-058-62	TI-520-058-62	62
520-058-64	TI-520-058-64	64
520-058-66	TI-520-058-66	66
520-058-68	TI-520-058-68	68
520-058-70	TI-520-058-70	70
520-058-72	TI-520-058-72	72
520-058-74	TI-520-058-74	74
520-058-76	TI-520-058-76	76
520-058-78	TI-520-058-78	78
520-058-80	TI-520-058-80	80
520-058-82	TI-520-058-82	82
520-058-84	TI-520-058-84	84
520-058-86	TI-520-058-86	86
520-058-88	TI-520-058-88	88

1-013 Implant Box for Expert Tibia Nailing



Implant Box

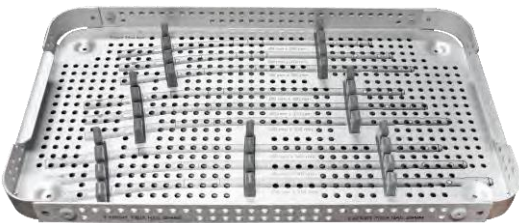
Tray 1



Dia	Length	Qty
Ø8mm	255mm to 375mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

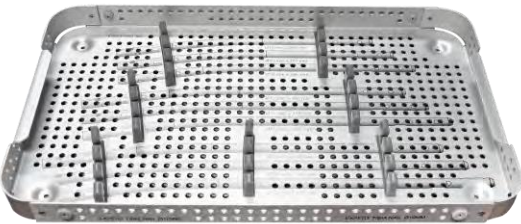
Tray 2



Dia	Length	Qty
Ø9mm	255mm to 375mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

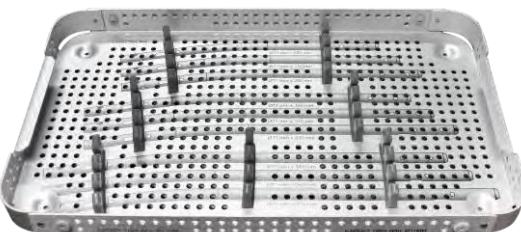
Tray 3



Dia	Length	Qty
Ø10mm	255mm to 375mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

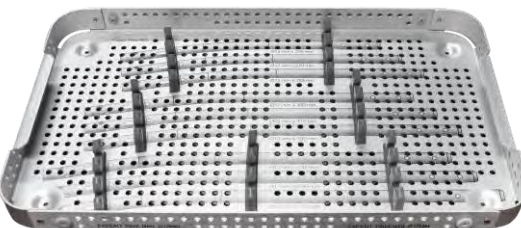
Tray 4



Dia	Length	Qty
Ø11mm	255mm to 375mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

Tray 5



Dia	Length	Qty
Ø12mm	255mm to 375mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

Implant Box



Ø4.8mm Locking Bolt, Self-Tapping, For Expert Tibia Nail

Dia	Length	Qty
Ø4.8mm	25mm to 90mm	3pcs

*Stainless Steel or Titanium Implants
can be placed as per requirement*

Ø4.4mm Locking Bolt, Self-Tapping, For Expert Tibia Nail

Dia	Length	Qty
Ø4.4mm	24mm to 88mm	6pcs

*Stainless Steel or Titanium Implants
can be placed as per requirement*

End Cap For Expert Tibia Nail

Length	Qty
0mm to 15mm	2pcs

*Stainless Steel or Titanium Implants
can be placed as per requirement*

T

Nail Instrument Set

520-03 Radiographic Ruler for Expert Tibia Nail



520-04 Guide Wire With Threaded Tip \varnothing 3.2mm x Thread Length 10mm x Length 300mm



520-05 Guide Wire Holder for Expert Tibia Nail



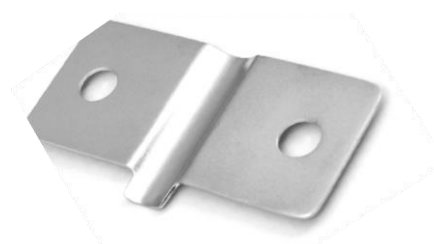
520-06 Protection Sleeve 14/12mm for Expert Tibia Nail



520-07 Entry Cutter \varnothing 12mm for Expert Tibia Nail



520-08 Tissue Protector for Expert Tibia Nail



520-09 Cannulated Awl for Expert Tibia Nail



520-10 Entry Reamer Ø12mm for Expert Tibia Nail



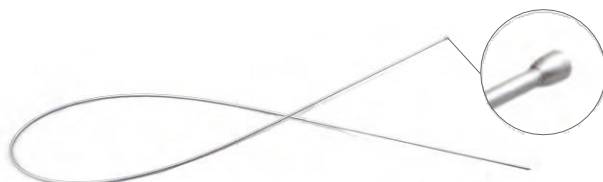
520-11 T- Handle for Entry Reamer - Expert Tibia Nail



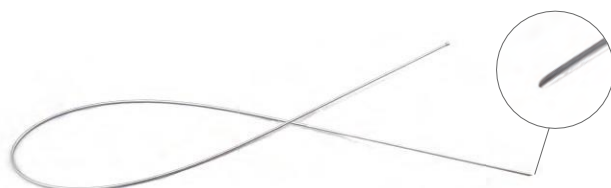
520-12 Reduction Device for Expert Tibia Nail



520-13 Guide wire with Ball Tip Ø2.5/3.65mm x Length 1000mm - Nitinol, for Expert Tibia Nail



520-058 Guide wire without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Tibia Nail



520-14

Flexible Reamer Shaft (AO Connection) for Expert Tibia Nail



Reamer Head

Code	Dia	Code	Dia
520-7.5	Ø7.5mm	520-10.5	Ø10.5mm
520-8.0	Ø8mm	520-11.0	Ø11mm
520-8.5	Ø8.5mm	520-11.5	Ø11.5mm
520-9.0	Ø9mm	520-12.0	Ø12mm
520-9.5	Ø9.5mm	520-12.5	Ø12.5mm
520-10.0	Ø10mm	520-13.0	Ø13mm



520-15

Insertion Handle for Expert Tibia Nail



520-16

Nail Holding Bolt for Expert Tibia Nail



520-018

Block for Connecting Shaft - Expert Tibia Nail



520-19 Connecting Shaft, M10 for Hammering Device - Expert Tibia Nail



520-20 Combination Wrench 11mm for Expert Tibia Nail



520-22 Hammer Guide Shaft for Expert Tibia Nail



520-23 Nut for Hammer Guide Shaft - Expert Tibia Nail



520-24 Sliding Hammer for Expert Tibia Nail



520-25 Distal Aiming Device for Expert Tibia Nail



520-26 Bolt for Distal Aiming Device - Expert Femur Nail



520-27 Allen Key, Hex 5mm for Expert Tibia Nail



520-28 Drill Sleeve, Ø5.2mm for Positioning Rod - Expert Tibia Nail



520-29 Drill Bit Plain Shank/ Jacob Chuck End Ø5.2mm x Length 250mm for Expert Tibia Nail



520-30 Ø5.2mm T-Handle Drill Bit with Flat End for Expert Tibia Nail



520-31 Positioning Rod for Expert Tibia Nail



520-32 Stabilizing Device for Expert Tibia Nail



520-33 Distal Aiming Arm for Expert Tibia Nail



520-34 Bolt for Distal Aiming Arm - Expert Tibia Nail



520-35 Protection Drill Sleeve 10/8mm for Expert Tibia Nail



520-36 Trocar Ø8mm for Expert Tibia Nail



520-37 Drill Sleeve 8/4mm for Ø4mm Drill Bit - Expert Tibia Nail



520-38

Drill Bit Plain Shank/Jacob Chuck End Ø4.0mm x Length 300mm for Expert Tibia Nail



520-39

Stopper for Ø4.0mm Drill Bit - Expert Tibia Nail



520-40

Allen Key, Hex 3mm for Expert Tibia Nail



520-41

Depth Gauge measuring upto 90mm for Expert Tibia Nail



520-059

Screwdriver with T-Handle, Hex 3.5mm for Expert Tibia Nail



520-044

Proximal Aiming Device for Ø4.4mm Locking Bolt - Expert Tibia Nail



520-45 Bolt for Proximal Aiming Device - Expert Tibia Nail



520-46 Proximal Aiming Device for Ø4.8mm Locking Bolt - Expert Tibia Nail



520-47 Protection Sleeve 11/8.6mm for Ø4.8mm Locking Bolt - Expert Tibia Nail



520-48 Drill Sleeve 8.5/3.2mm for Ø3.2mm Drill Bit - Expert Tibia Nail



520-49 Trocar Ø3.2mm for Expert Tibia Nail



520-50 Drill Bit Plain Shank/Jacob Chuck End Ø3.2mm x Length 250mm for Expert Tibia Nail



520-51 Stopper for Ø3.2mm Drill Bit - Expert Tibia Nail



520-52 Compression Device for Expert Tibia Nail



520-53 Universal Driver for Nail Holding Bolt - Expert Tibia Nail



520-42 Universal Screwdriver, Hex 3.5mm for Expert Tibia Nail



520-060 Depth Gauge measuring upto 100mm for Expert Tibia Nail



7-010-02 Medullary Exchange Tube



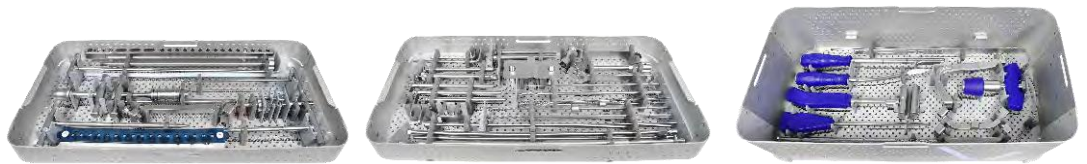
7-010-03

T-Handle for Flexible Reamer (AO Connection)



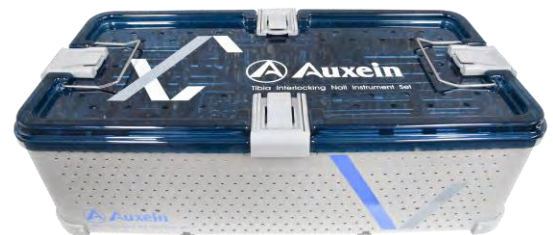
520-56

Instrument Trays For Expert Tibia Nailing Instrument Set



520-57

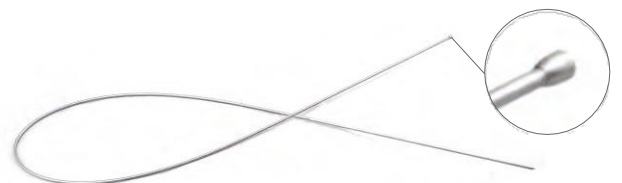
Container with PPSU Lid for Expert Tibia Nailing Instrument Set



Optional Instruments

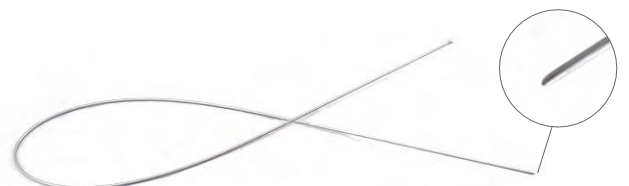
520-013S

Guide Wire With Ball Tip $\varnothing 2.5/3.65\text{mm}$ x Length 1000mm - Stainless Steel, for Expert Tibia Nail

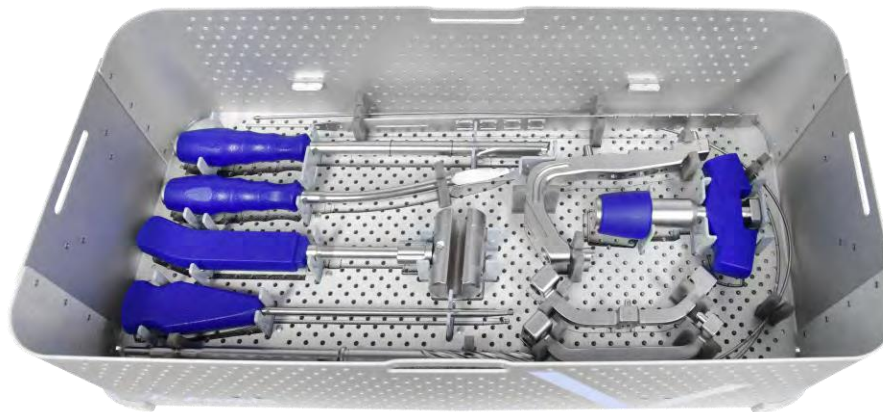
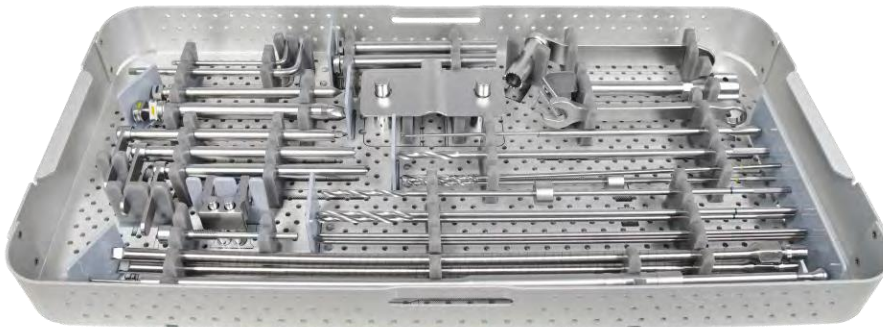
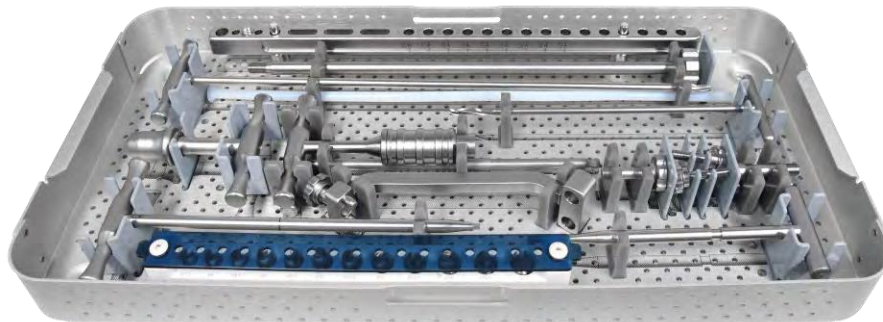


520-58 S

Guide Wire Without Ball Tip $\varnothing 2.5\text{mm}$ x Length 1000mm - Stainless Steel, for Expert Tibia Nail



INS-520 Expert Tibia Nailing Instrument Set



INS-520 Expert Tibia Nailing Instrument Set

Code	Set Consisting of	Units
520-003	Radiographic Ruler for Expert Tibia Nail	1
520-004	Guide Wire With Threaded Tip Ø3.2mm x Thread Length 10mm x Length 300mm	3
520-005	Guide Wire Holder for Expert Tibia Nail	1
520-006	Protection Sleeve 14/12mm for Expert Tibia Nail	1
520-007	Entry Cutter Ø12mm for Expert Tibia Nail	1
520-008	Tissue Protector for Expert Tibia Nail	1
520-009	Cannulated Awl for Expert Tibia Nail	1
520-010	Entry Reamer Ø12mm for Expert Tibia Nail	1
520-011	T- Handle for Entry Reamer - Expert Tibia Nail	1
520-012	Reduction Device for Expert Tibia Nail	1
520-013	Guide wire with Ball Tip Ø2.5/3.65mm x Length 1000mm - Nitinol, for Expert Tibia Nail	1
520-058	Guide wire without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Tibia Nail	1
520-014	Flexible Reamer Shaft (AO Connection) for Expert Tibia Nail	2
520-7.5	Reamer Head, Ø7.5mm for Expert Tibia Nail	1
520-8.0	Reamer Head, Ø8.0mm for Expert Tibia Nail	1
520-8.5	Reamer Head, Ø8.5mm for Expert Tibia Nail	1
520-9.0	Reamer Head, Ø9.0mm for Expert Tibia Nail	1
520-9.5	Reamer Head, Ø9.5mm for Expert Tibia Nail	1
520-10.0	Reamer Head, Ø10.0mm for Expert Tibia Nail	1
520-10.5	Reamer Head, Ø10.5mm for Expert Tibia Nail	1
520-11.0	Reamer Head, Ø11.0mm for Expert Tibia Nail	1
520-11.5	Reamer Head, Ø11.5mm for Expert Tibia Nail	1
520-12.0	Reamer Head, Ø12.0mm for Expert Tibia Nail	1
520-12.5	Reamer Head, Ø12.5mm for Expert Tibia Nail	1
520-13.0	Reamer Head, Ø13.0mm for Expert Tibia Nail	1
520-015	Insertion Handle for Expert Tibia Nail	1
520-016	Nail Holding Bolt for Expert Tibia Nail	2
520-018	Block for Connecting Shaft - Expert Tibia Nail	1
520-019	Connecting Shaft, M10 for Hammering Device - Expert Tibia Nail	1
520-020	Combination Wrench 11mm for Expert Tibia Nail	1
520-022	Hammer Guide Shaft for Expert Tibia Nail	1
520-023	Nut for Hammer Guide Shaft - Expert Tibia Nail	1
520-024	Sliding Hammer for Expert Tibia Nail	1
520-025	Distal Aiming Device for Expert Tibia Nail	1
520-026	Bolt for Distal Aiming Device - Expert Femur Nail	1
520-027	Allen Key, Hex 5mm for Expert Tibia Nail	1

Code	Set Consisting of	Units
520-028	Drill Sleeve, Ø5.2mm for Positioning Rod - Expert Tibia Nail	1
520-029	Drill Bit Plain Shank/ Jacob Chuck End Ø5.2mm x Length 250mm for Expert Tibia Nail	1
520-030	Ø5.2mm T-Handle Drill Bit with Flat End for Expert Tibia Nail	1
520-031	Positioning Rod for Expert Tibia Nail	1
520-032	Stabilizing Device for Expert Tibia Nail	1
520-033	Distal Aiming Arm for Expert Tibia Nail	1
520-034	Bolt for Distal Aiming Arm - Expert Tibia Nail	1
520-035	Protection Drill Sleeve 10/8mm for Expert Tibia Nail	2
520-036	Trocar Ø8mm for Expert Tibia Nail	1
520-037	Drill Sleeve 8/4mm for Ø4mm Drill Bit - Expert Tibia Nail	2
520-038	Drill Bit Plain Shank/Jacob Chuck End Ø4.0mm x Length 300mm for Expert Tibia Nail	3
520-039	Stopper for Ø4.0mm Drill Bit - Expert Tibia Nail	1
520-040	Allen Key, Hex 3mm for Expert Tibia Nail	1
520-041	Depth Gauge measuring upto 90mm for Expert Tibia Nail	1
520-059	Screwdriver with T-Handle, Hex 3.5mm for Expert Tibia Nail	1
520-044	Proximal Aiming Device for Ø4.4mm Locking Bolt - Expert Tibia Nail	1
520-045	Bolt for Proximal Aiming Device - Expert Tibia Nail	2
520-046	Proximal Aiming Device for Ø4.8mm Locking Bolt - Expert Tibia Nail	1
520-047	Protection Sleeve 11/8.6mm for Ø4.8mm Locking Bolt - Expert Tibia Nail	1
520-048	Drill Sleeve 8.5/3.2mm for Ø3.2mm Drill Bit - Expert Tibia Nail	1
520-049	Trocar Ø3.2mm for Expert Tibia Nail	1
520-050	Drill Bit Plain Shank/Jacob Chuck End Ø3.2mm x Length 250mm for Expert Tibia Nail	2
520-051	Stopper for Ø3.2mm Drill Bit - Expert Tibia Nail	1
520-052	Compression Device for Expert Tibia Nail	1
520-053	Universal Driver for Nail Holding Bolt - Expert Tibia Nail	1
520-042	Universal Screwdriver, Hex 3.5mm for Expert Tibia Nail	1
520-060	Depth Gauge measuring upto 100mm for Expert Tibia Nail	1
7-010-02	Medullary Exchange Tube	1
7-010-03	T-Handle for Flexible Reamer (AO Connection)	1
520-056	Instrument Trays For Expert Tibia Nailing Instrument Set	3
520-057	Container with PPSU Lid for Expert Tibia Nailing Instrument Set	1

T

**Nail Instrument Set
(Suprapatellar Insertion)**

7-112-01

Insertion Handle for Expert Tibia Nail - Suprapatellar Insertion



7-112-02

Protection Sleeve Handle for Expert Tibia Nail - Suprapatellar Insertion



7-112-03

Outer Protection Sleeve for Expert Tibia Nail - Suprapatellar Insertion



7-112-04

Protection Sleeve 16/14.5mm for Expert Tibia Nail - Suprapatellar Insertion



7-112-05

Trocar Ø14.5mm, PEEK, for Expert Tibia Nail - Suprapatellar Insertion



7-112-06

Centering Sleeve 14.5/3.2mm for Expert Tibia Nail - Suprapatellar Insertion



7-112-07

Proximal Aiming Device for Ø4.4mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)



7-112-08

Bolt for Proximal Aiming Device - Expert Tibia Nail (Suprapatellar Insertion)



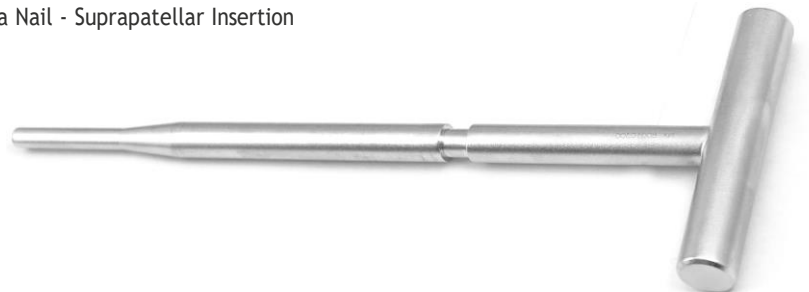
7-112-09

Proximal Aiming Device for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)



7-112-10

Positioning Rod For Expert Tibia Nail - Suprapatellar Insertion



7-112-11

Stabilizing Device for Expert Tibia Nail - Suprapatellar Insertion



7-112-12

Distal Aiming Arm for Expert Tibia Nail - Suprapatellar Insertion



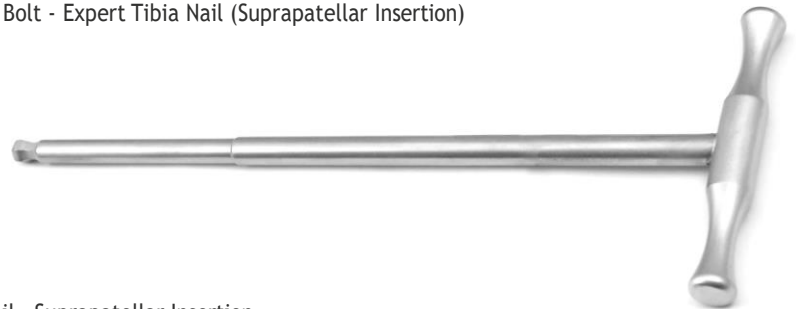
7-112-13

Bolt for Distal Targeting Device, for Expert Tibia Nail - Suprapatellar Insertion



7-112-14

Universal Driver for Nail Holding Bolt - Expert Tibia Nail (Suprapatellar Insertion)



7-112-15

Entry Reamer for Expert Tibia Nail - Suprapatellar Insertion



7-112-16

Compression Device for Expert Tibia Nail - Suprapatellar Insertion



7-112-17

Extraction Screw for Expert Tibia Nail - Suprapatellar Insertion



7-112-18

Connecting Shaft for Expert Tibia Nail - Suprapatellar Insertion



7-112-19

Nail Holding Bolt, Long, for Expert Tibia Nail - Suprapatellar Insertion



7-112-20

Combination Wrench 11mm for Expert Tibia Nail - Suprapatellar Insertion



7-112-21

Sliding Hammer for Expert Tibia Nail - Suprapatellar Insertion



7-112-22

Hammer Guide Shaft for Expert Tibia Nail - Suprapatellar Insertion



7-112-23

Nut for Hammer Guide Shaft - Expert Tibia Nail - Suprapatellar Insertion



7-112-24

Radiographic Ruler for Expert Tibia Nail - Suprapatellar Insertion



520-004

Guide Wire With Threaded Tip \varnothing 3.2mm x Thread Length 10mm x Length 300mm



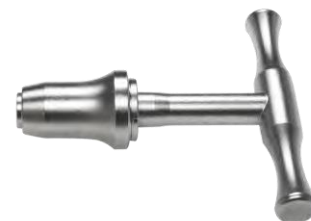
7-112-25

Entry Cutter for Expert Tibia Nail - Suprapatellar Insertion



7-112-26

Quick Coupling T Handle for Expert Tibia Nail - Suprapatellar Insertion



7-112-27

Cannulated Awl for Expert Tibia Nail - Suprapatellar Insertion



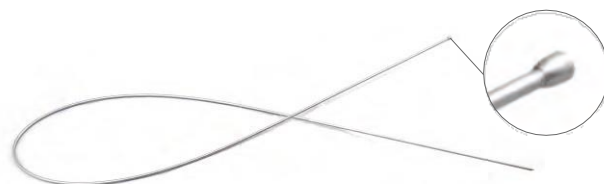
7-112-28

Reduction Device for Expert Tibia Nail - Suprapatellar Insertion



520-013

Guide wire with Ball Tip \varnothing 2.5/3.65mm x Length 1000mm - Nitinol, for Expert Tibia Nail



520-058

Guide wire without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Tibia Nail



7-112-29

Guide Wire Holder for Expert Tibia Nail - Suprapatellar Insertion



7-112-30

Flexible Reamer Shaft (Jacob Connection) for Expert Tibia Nail - Suprapatellar Insertion



Reamer Head

Code	Dia	Code	Dia
7-112-31	Ø7.5mm	7-112-37	Ø10.5mm
7-112-32	Ø8mm	7-112-38	Ø11mm
7-112-33	Ø8.5mm	7-112-39	Ø11.5mm
7-112-34	Ø9mm	7-112-40	Ø12mm
7-112-35	Ø9.5mm	7-112-41	Ø12.5mm
7-112-36	Ø10mm	7-112-42	Ø13mm



7-112-43

Distal Aiming Device for Expert Tibia Nail - Suprapatellar Insertion



7-112-44

Ø5.2mm T-Handle Drill Bit with Flat End for Expert Tibia Nail - Suprapatellar Insertion



7-112-45

Bolt for Distal Aiming Arm - Expert Tibia Nail (Suprapatellar Insertion)



7-112-46

Allen Key, Hex 5mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-47

Drill Sleeve, Ø5.2mm for Positioning Rod - Expert Tibia Nail (Suprapatellar Insertion)



7-112-48

Drill Bit Plain Shank/ Jacob Chuck End Ø5.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-49

Protection Drill Sleeve 10/8mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-50

Trocar Ø8mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-51

Drill Sleeve 8/4mm for Ø4mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)



7-112-52

Drill Bit Plain Shank/Jacob Chuck End Ø4.0mm x Length 300mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-53

Stopper for Ø4.0mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)



7-112-54

Allen Key, Hex 3mm for Expert Tibia Nail (Suprapatellar Insertion)



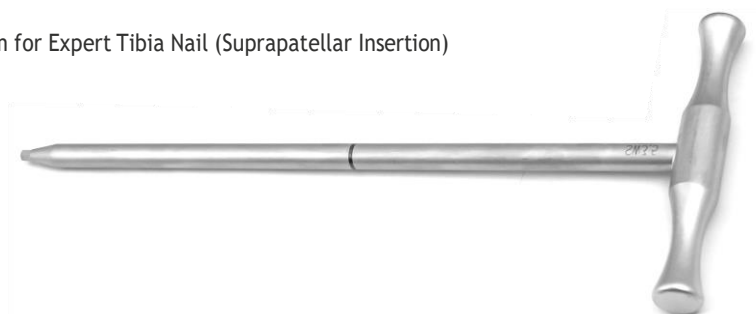
7-112-55

Depth Gauge measuring upto 90mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-56

Screwdriver with T-Handle, Hex 3.5mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-57 Protection Sleeve 11/8.6mm for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)



7-112-58 Drill Sleeve 8.5/3.2mm for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)



7-112-59 Trocar Ø3.2mm for Expert Tibia Nail (Suprapatellar Insertion)



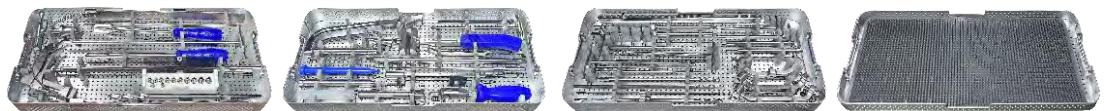
7-112-60 Drill Bit Plain Shank/Jacob Chuck End Ø3.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)



7-112-61 Stopper for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)



7-112-62 Instrument Trays for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)



7-112-63 Container with PPSU lid for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)



7-112 Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)



7-112 Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)

Code	Set Consisting of	Units
7-112-01	Insertion Handle for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-02	Protection Sleeve Handle for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-03	Outer Protection Sleeve for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-04	Protection Sleeve 16/14.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-05	Trocar Ø14.5mm, PEEK, for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-06	Centering Sleeve 14.5/3.2mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-07	Proximal Aiming Device for Ø4.4mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-08	Bolt for Proximal Aiming Device - Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-09	Proximal Aiming Device for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-10	Positioning Rod For Expert Tibia Nail - Suprapatellar Insertion	1
7-112-11	Stabilizing Device for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-12	Distal Aiming Arm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-13	Bolt for Distal Targeting Device, for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-14	Universal Driver for Nail Holding Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-15	Entry Reamer for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-16	Compression Device for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-17	Extraction Screw for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-18	Connecting Shaft for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-19	Nail Holding Bolt, Long, for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-20	Combination Wrench 11mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-21	Sliding Hammer for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-22	Hammer Guide Shaft for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-23	Nut for Hammer Guide Shaft - Expert Tibia Nail - Suprapatellar Insertion	1
7-112-24	Radiographic Ruler for Expert Tibia Nail - Suprapatellar Insertion	1
520-004	Guide Wire With Threaded Tip Ø3.2mm x Thread Length 10mm x Length 300mm	3
7-112-25	Entry Cutter for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-26	Quick Coupling T Handle for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-27	Cannulated Awl for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-28	Reduction Device for Expert Tibia Nail - Suprapatellar Insertion	1
520-013	Guide wire with Ball Tip Ø2.5/3.65mm x Length 1000mm - Nitinol, for Expert Tibia Nail	1
520-058	Guide wire without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Tibia Nail	1
7-112-29	Guide Wire Holder for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-30	Flexible Reamer Shaft (Jacob Connection) for Expert Tibia Nail - Suprapatellar Insertion	2

Code	Set Consisting of	Units
7-112-31	Reamer Head, Ø7.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-32	Reamer Head, Ø8.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-33	Reamer Head, Ø8.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-34	Reamer Head, Ø9.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-35	Reamer Head, Ø9.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-36	Reamer Head, Ø10.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-37	Reamer Head, Ø10.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-38	Reamer Head, Ø11.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-39	Reamer Head, Ø11.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-40	Reamer Head, Ø12.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-41	Reamer Head, Ø12.5mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-42	Reamer Head, Ø13.0mm for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-43	Distal Aiming Device for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-44	Ø5.2mm T-Handle Drill Bit with Flat End for Expert Tibia Nail - Suprapatellar Insertion	1
7-112-45	Bolt for Distal Aiming Arm - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-46	Allen Key, Hex 5mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-47	Drill Sleeve, Ø5.2mm for Positioning Rod - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-48	Drill Bit Plain Shank/ Jacob Chuck End Ø5.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-49	Protection Drill Sleeve 10/8mm for Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-50	Trocar Ø8mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-51	Drill Sleeve 8/4mm for Ø4mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-52	Drill Bit Plain Shank/ Jacob Chuck End Ø4.0mm x Length 300mm for Expert Tibia Nail (Suprapatellar Insertion)	3
7-112-53	Stopper for Ø4.0mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-54	Allen Key, Hex 3mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-55	Depth Gauge measuring upto 90mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-56	Screwdriver with T-Handle, Hex 3.5mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-57	Protection Sleeve 11/8.6mm for Ø4.8mm Locking Bolt - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-58	Drill Sleeve 8.5/3.2mm for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-59	Trocar Ø3.2mm for Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-60	Drill Bit Plain Shank/ Jacob Chuck End Ø3.2mm x Length 250mm for Expert Tibia Nail (Suprapatellar Insertion)	2
7-112-61	Stopper for Ø3.2mm Drill Bit - Expert Tibia Nail (Suprapatellar Insertion)	1
7-112-62	Instrument Trays for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)	3
7-112-63	Container with PPSU lid for Expert Tibia Nailing Instrument Set (Suprapatellar Insertion)	1



Surgical Technique

Expert Femoral Nailing System

INTRODUCTION

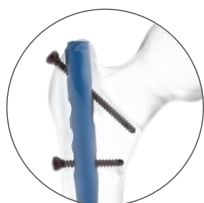
The Expert Femoral Nail enables the surgeon to stabilize subtrochanteric femoral fractures, ipsilateral neck/shaft fractures, femoral shaft fractures, impending pathological fractures, malunions and nonunions.

LOCKING OPTIONS

Standard Locking

The Expert Femoral Nail with standard locking is indicated for fractures in femoral shaft (except subtrochanteric fractures).

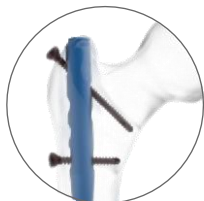
- For sufficient proximal **static** locking, always use the 120° antegrade locking option together with the transverse static screw.



- For immediate **primary dynamization**, insert only one proximal locking screw through the dynamic slot.



- For **secondary dynamization** use both the dynamic and the 120° antegrade locking position and remove the 120° locking when required.

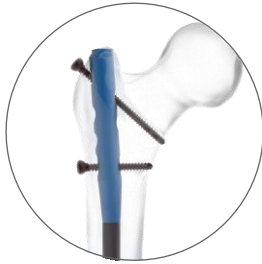


INDICATIONS

Standard Locking Indications

The Expert Femoral Nail with standard locking is indicated for fractures in the Femoral Shaft:

32-A/B/C (except subtrochanteric fractures 32-A [1-3].1, 32-B [1-3].1, and 32-C [1-3].1).



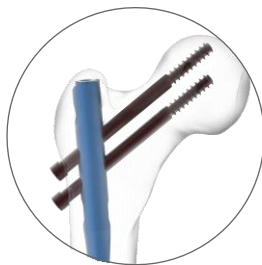
Reconstruction Locking Indications

The Expert Femoral Nail with reconstruction locking is indicated for fractures in the femoral shaft in case of combination with femoral neck fractures:

32-A/B/C combined with 31-B (double ipsilateral fractures).

Additionally the Expert Femoral Nail is indicated for fractures in the subtrochanteric section:

32-A [1-3].1, 32-B [1-3].1, and 32-C [1-3].1.



Contraindications: Contraindications may be relative or absolute. The choice of particular device must be carefully weighed against patient's overall condition.

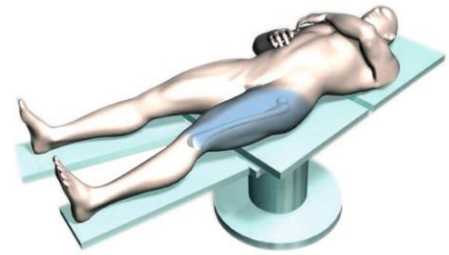
Conditions listed below may preclude or reduce the chance of successful outcome:

- Isolated or combined medial femoral neck fractures
- Low subtrochanteric fractures
- Femoral shaft fractures
- Medial neck fractures
- Signs of local inflammation
- Infection local to the operative site
- Fever or leukocytosis
- Blood supply limitation in operative site
- Morbid Obesity
- Any case in which there is inadequate tissue coverage of the operative site

The above mentioned list does not exhaust the topic of contraindications.

Patient Positioning: The patient is positioned supine on a fracture or radiolucent table. The C-arm is now positioned in such a way to allow visualization of proximal femur, fracture site and distal femur.

Fracture Reduction: Prior to Nail measurement, it is important to achieve fracture reduction manually under the C-arm.



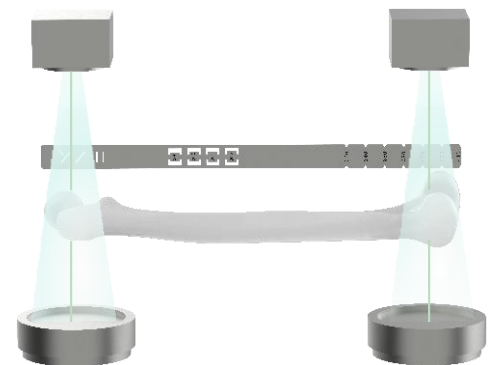
Measuring Nail Dimensions: The Nail length and dia. are measured after the fracture reduction has been achieved. Firstly, the C-arm is positioned in AP view of the proximal femur. Now the Radiographic ruler (1459-063) is held alongside the lateral thigh, parallel to and at same level as femur.

The ruler is adjusted until the proximal end is at the desired nail insertion position. Accordingly, the skin is marked at the proximal end of the ruler.

Now the C-arm is positioned at the distal femur. While moving the C-arm from proximal to distal end verify the fracture reduction. Align the proximal end of the radiographic ruler to the skin mark and take an AP view image of distal femur. From the captured image, viewing at or just proximal to the epiphyseal scar note down the ruler reading for the required nail length.

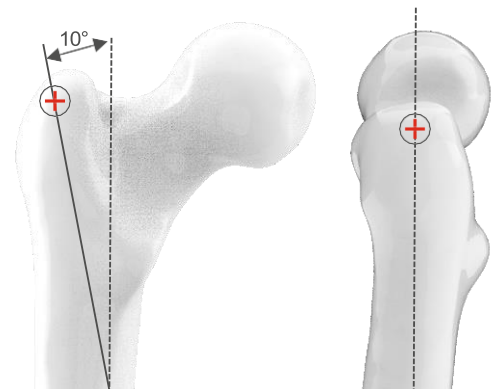
Note: The Nail length can alternatively be determined by performing the above mentioned procedure on the uninjured leg.

The Radiographic Ruler (1459-063) canal diameter gauge is placed perpendicular to the femur axis so that the gauge is located over the isthmus. The diameter is selected with which the medullary canal to cortex transition is still visible on both sides of the gauge.



Approach: Examine the posterior edge of the greater trochanter. A 3mm incision is made in line with the central axis of the intramedullary canal in lateral view and 2 to 5cm proximal to the tip of greater trochanter, depending on the anatomy of the patient.

Determine the entry point: It is very important part of the entire surgery as it determines an optimal final position of Expert Femoral Nail in the intramedullary canal. In AP view the entry point is approximately 10° lateral to the axis of medullary canal. Depending on individual anatomy it is situated lateral from the greater trochanter. In lateral view the entry point is in line with the intramedullary canal axis.



Guide wire insertion: The Threaded guide wire Ø3.2 mm (1459-060-1) is secured in the Guide wire holder (1459-055-1). The mediolateral angle of the Expert Femoral nail is 10° and so in AP view, guide wire has to be inserted laterally to the greater trochanter at an angle of 10° to the intended extension of medullary canal. The guide wire is inserted 15 to 20cm into the medullary canal and the final position is inspected under the image intensifier.



Open Medullary Canal: There are two different alternatives to open the intramedullary canal as described below:

1. Using Entry Reamer: Align the Protection sleeve (1459-053) concentric to the pre-inserted guide wire. The Entry Reamer (1459-002) is attached to the T-handle with quick coupling (1459-003). The Assembly is then inserted over the guide wire through the protection sleeve. It is advised to continuously move the reamer in to & fro motion while reaming to clear debris from medullary cavity and to avoid jamming.



2. Using the Cannulated Awl: For opening the medullary canal with the cannulated awl, the awl is placed over the guide wire and now a twisting motion is used to advance the awl to an approximate depth of 10cm.



Reaming the medullary canal: If necessary, the femoral canal is enlarged to the desired diameter for nail insertion. Before reaming, it is necessary to reduce any shaft fracture and align the intramedullary canal. Firstly, the reduction is performed by inserting a reduction rod (1459-007) through the predrilled hole along with the ball tip guide wire (1459-004) through the cannulation. After performing reduction, the reduction rod is removed and the ball tip guide wire is left behind in the intramedullary canal. Under the image intensifier, the fracture reduction is verified.



Attach the Flexible Reamer shaft (1459-006) with the suitable reamer head (1459-008 to 1459-019). The assembly is then glided over the ball tip guide wire to perform intramedullary reaming. The reaming is started with 8.5mm diameter and reamed to a dia. of 0.5 to 1.5mm greater than the selected nail diameter. Reaming is performed in 0.5mm increments.

Note: While reaming it is advised to hold the ball tip guide wire to prevent it from rotating and jamming the flexible reamer.



Nail & Jig Assembly: The Insertion Handle (1459-005) is positioned in such a way that the tab on the insertion handle aligns and sits in the Nail slot. Insert the Nail holding bolt (1459-020) through the insertion handle to tighten nail in place. Universal Screwdriver, Hex 6.5mm, Ball tip (1459-045) is used to tighten the nail holding bolt.

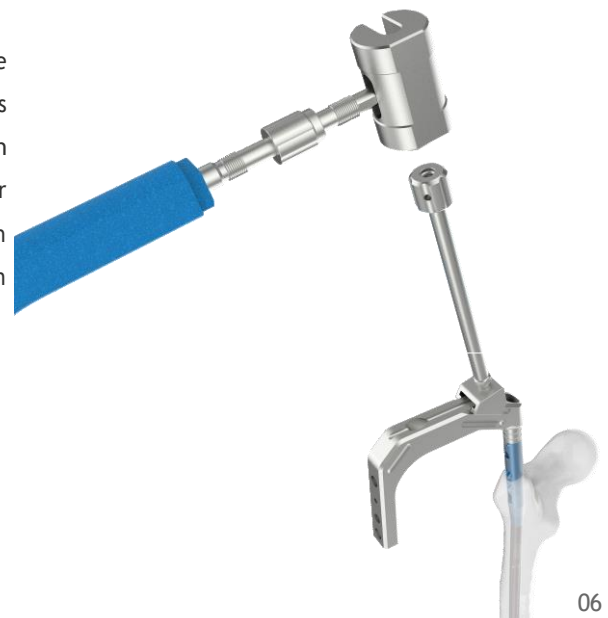


Nail Insertion: The Insertion handle and Nail assembly is oriented anteriorly to insert it into the medullary canal. Slight twisting motion is used to rotate the insertion handle 90° from anterior to lateral position to advance the last one third of the nail into the medullary canal.

The Nail is inserted until it reaches at or below the femoral opening and the final position is verified in both AP and lateral views under the Image intensifier.



If the nail is not fully inserted with the above method, then it is advised to use the slight hammer blows for nail insertion. The connecting rod-impactor (1459-058) is slid into the grooves on the insertion handle and using combination wrench (1459-057) is secured onto the insertion handle. The head of the Sliding Hammer (1459-022) is locked in place by tightening the nut below the head. Proceed with light strikes on the top of connector using hammer for final seating of the nail in the intramedullary canal. Remove the connecting rod after final seating.



Alternatively, the Impactor-Extractor rod (1459-054) can be secured into the threads on top of Connecting rod-impactor. The Sliding hammer is then slid into the rod and the nut near the hammer head is loosened to let the hammer freely slide on rod and impact the nail in bone.

Note:

- It is highly advised not to strike the insertion handle directly with the Hammer.
- If nail insertion is difficult then ream intramedullary canal to a large diameter or insert a small diameter nail.
- After hammering confirm that the nail is securely connected to the insertion handle. Retighten if necessary.

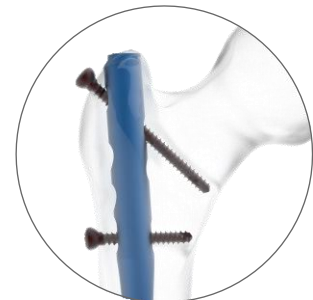
In case dynamization is planned for fracture reduction, it is recommended to over insert the nail by more than 7mm.



Proximal Locking: There are two different locking options at the proximal end of the nail as described below:

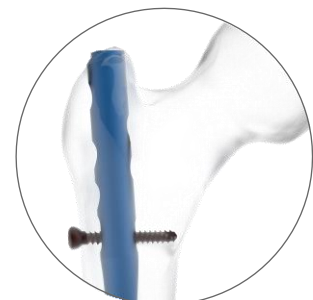
1. Standard Locking: The standard Locking has further 3 different locking options depending on if dynamic or static locking is required at the proximal end of nail.

a) In order to achieve sufficient proximal static locking, the Ø4.8mm Locking bolt is inserted in 120° antegrade position along with another Ø4.8mm Locking bolt in transverse position.



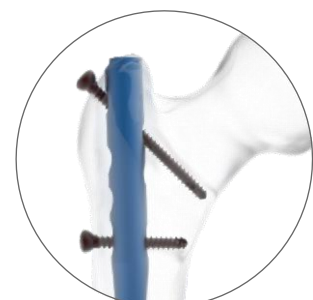
a)

b) In order to achieve immediate primary dynamization only one Ø4.8mm Locking bolt is inserted through the dynamic slot in the nail.



b)

c) For secondary dynamization, two Ø4.8mm Locking bolts are inserted one in 120° Antegrade position and second one in the dynamization hole.



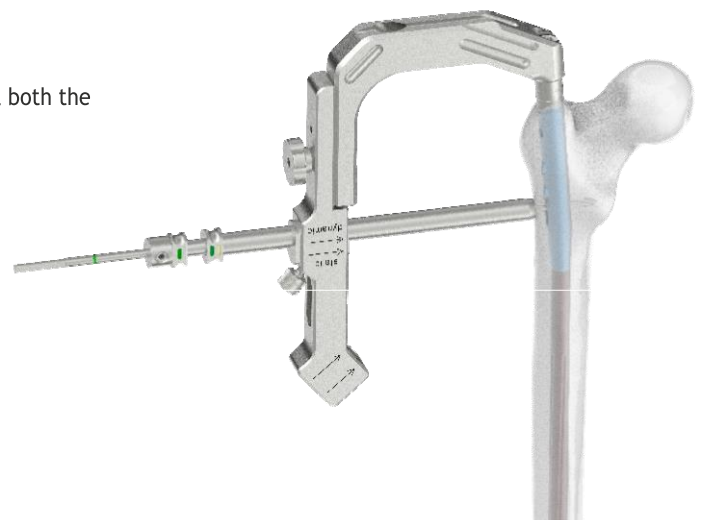
For Proximal Locking, Proximal Aiming Device (1459-026) is attached to the insertion handle. Now depending on if static or dynamic locking is required, the sleeve inside the proximal aiming arm is adjusted accordingly as per static and dynamic marking on the aiming arm.



The green trocar assembly [Outer drill sleeve 11/8.2mm (1459-037), Drill sleeve, Ø8/4.3mm (1459-040) & Trocar Ø4.3mm (1459-041)] is inserted through the aiming arm with the sleeve positioned in preferred configuration. A stab incision using trocar is then made to insert and sit flush the drill sleeve with the bone. The trocar is removed.



The Ø4.3mm Drill bit (1459-042) is used through the Drill Sleeve to drill both the cortex until the tip of drill bit just penetrates the far cortex.



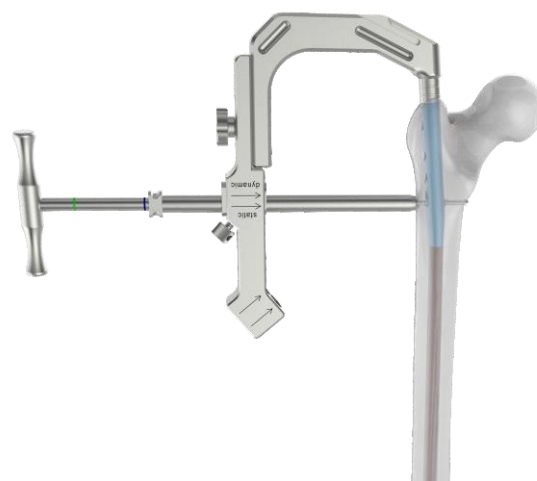
The Depth Gauge (1459-043) is inserted through the outer sleeve (1459-037) after removing the drill sleeve (1459-040) until the hook on the gauge grasps the far cortex. The marking on the gauge is then noted indicating the required locking bolt length.

Note: Before taking measurement ensure that the outer sleeve sits flush with the bone in order to get correct length of the locking bolt.



The Ø4.8mm Locking bolt of appropriate length is inserted through the outer sleeve with the help of the Screwdriver with T- handle (1459-044) and is tightened in the predrilled hole. The final position of the screw is verified under image intensifier. The locking bolt tip should not project more than 1 to 2mm beyond the medial far cortex.

For antegrade locking option repeat the above mentioned steps with the trocar assembly inserted through the oblique hole in the insertion handle.



In order to achieve dynamization, it is advised to perform distal locking first. After the Ø4.8mm locking bolt has been inserted in the dynamic hole at the proximal end of nail, the Ø4.0mm compression bolt (1459-059) is passed from top of the insertion handle and tightened with the help of the Universal screwdriver (1459-045). This causes the nail to move upwards along with the distal end of fractured bone and hence causing the fracture reduction. If there is a requirement for antegrade locking it should be performed only after the dynamization has been achieved.



2. Reconstruction Locking: For reconstruction locking, the same proximal aiming device (1459-026) is attached to the insertion handle used for standard locking. Now through the reconstruction locking holes in the proximal aiming device, the yellow trocar assembly [outer sleeve 11/8.2mm (1459-037), drill sleeve Ø8.2mm (1459-038) & Trocar Ø2.5mm (1459-039)] is inserted and stab incision is made until the outer sleeve sits flush with the bone. The Caudal trocar is removed.



The Ø2.5mm Guide wire (1459-047) is inserted through the drill sleeve into the femoral head and check its final placement in the bone under image intensifier in both AP and lateral views. After removing the Cranial trocar, the second guide wire is inserted into the femoral head and final placement is verified under image intensifier in both AP and lateral views.

Note: It is advised not to exert force on the proximal aiming device, outer sleeves, drill sleeves and trocars as it may prevent accurate targeting through the proximal holes and could damage the drill bits.



It is recommended to start with insertion of a Ø6.4mm Anti-rotation screw at the caudal end.

The Measuring device (1456-049) is slid over the pre-inserted Ø2.5mm guide wire. Reading on the measuring device is noted indicating the required length of the Ø6.4mm Anti-rotation screw. Remove the measuring device and caudal guide wire.



The drilling length on the $\varnothing 6.5/2.5$ mm Cannulated step drill bit (1459-051) is set to the previously measured length using measuring device. The Cannulated drill bit is attached to the Quick coupling T-Handle (1459-003) and guided through the outer sleeve (1459-037) to drill the bone. The stopper on drill bit prevents it to drill past the desired set length.



The Long screwdriver with T-Handle (1459-021) is attached to the Anti-rotation screw of predetermined length and is inserted into femoral head through the outer sleeve. Once the screw is seated, confirm its final position using image intensifier in both AP and lateral planes. Repeat the above mentioned steps for inserting the Anti-rotation screw at the cranial end.



Distal Locking: $\varnothing 4.8$ mm Locking bolts are used for locking the nail from distal end. In order to achieve dynamization it is advised to lock the nail distally first.

Jig Assembly: The Proximal Aiming device (1459-026) is firstly detached from the Insertion handle (1459-005) and the Proximal Aiming bar (1459-023) is attached instead with the help of Locking bolt for proximal aiming bar (1459-024). The Distal Aiming bar (1459-027) is attached to the Proximal Aiming bar. The arrow indicated on the Proximal Aiming bar is aligned with the arrow corresponding to the nail length being used. The Hole in Distal Aiming bar is aligned with the left or right marked holes in the proximal aiming bar depending on the type of nail used (Left or right) and is locked in place with the help of Locking bolt for Distal Aiming Bar (1459-028).



Nail Repositioning: Prior to Ø4.8mm locking bolt insertion at the distal end of nail it is necessary to reposition the nail distally in order to align the nail holes with the holes in the Distal Aiming bar. Firstly, the Distal Targeting Device (1459-029) is attached to the Distal Aiming Bar and fixed with the help of Locking bolt for distal targeting device (1459-046). The Blue Trocar assembly [Outer Drill Sleeve 10/8.1mm (1459-030) & Trocar for Sleeve 8.1mm (1459-031)] is inserted through the distal targeting device hole and a stab incision is made to make a skin incision and advance the outer sleeve until it sits flush on bone.



Remove the trocar and insert the Drill sleeve 8.1/5.2mm (1459-032) into the outer sleeve. Through the drill sleeve insert Ø5.2mm Flat drill with T handle (1459-034) and drill until the end of drill bit reaches the groove on the nail.



Remove the drill bit along with drill sleeve and insert the Positioning Rod 8.1/5.2mm (1459-035) through the outer sleeve such that it sits on the groove on the nail. Push the nail using positioning rod and hold it in place using the stabilizing device (1459-036) as shown in the adjoining figure. Verify the final alignment of nail holes with respect to the distal aiming bar holes under the image intensifier.



Drilling: After the nail has been stabilized the distal $\varnothing 4.8\text{mm}$ Locking bolt can now be inserted. The Green trocar assembly [Outer drill sleeve 11/8.2mm (1459-037), Drill sleeve $\varnothing 4.3\text{mm}$ (1459-040) & Trocar $\varnothing 4.3\text{mm}$ (1459-041)] is passed through two distal holes of the distal aiming bar (1459-027) and a stab incision is made to advance the sleeve through the skin until it sits flush with the bone.



The trocar is removed and $\varnothing 4.3\text{mm}$ Drill bit is inserted to drill the bone. Once the bone has been drilled remove the drill sleeve and use the depth gauge (1459-043) to determine the required $\varnothing 4.8\text{mm}$ locking bolt length for insertion.



Screw Insertion: Using the Screwdriver with T handle (1459-044), the $\varnothing 4.8\text{mm}$ Locking bolt of selected length is inserted through the outer sleeve and is tightened into the bone. The stabilizing device along with the positioning rod are removed at the end.



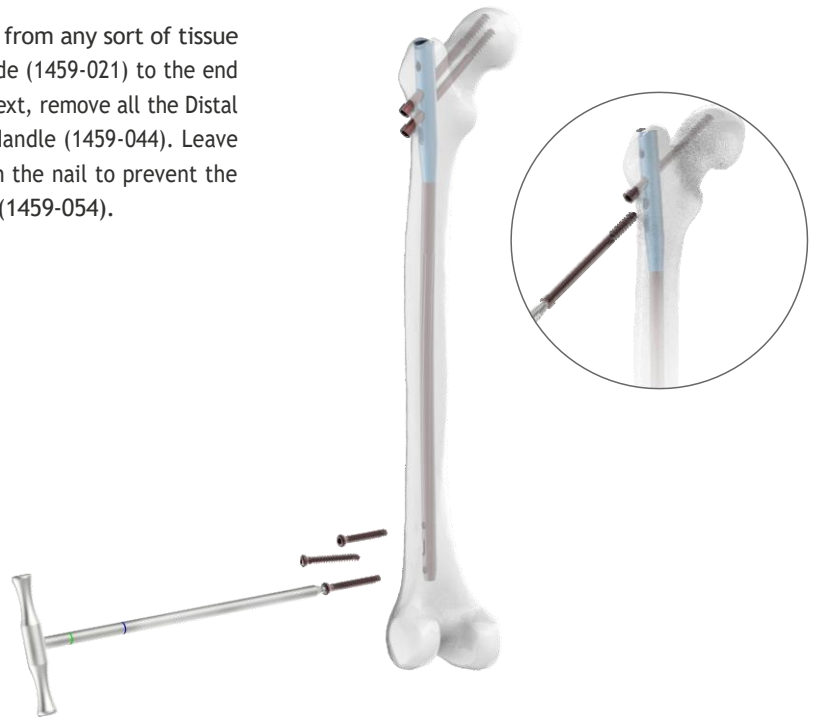
There is also a dynamic hole at distal end of nail which provides option for static or dynamic locking as per the requirement. The Distal screw device (1459-056) is attached to the holes at the distal end of distal aiming bar and fixed with the help of bolt for distal targeting device (1459-046). As per requirement the sleeve inside the Distal screw device is adjusted in static or dynamic configuration. The above mentioned same steps are then used for drilling and screw insertion either in static or dynamic hole.



Insert End cap: The Distal locking jig along with the insertion handle is removed. The end cap is then attached to the Long Screwdriver with T-Handle, hex 5mm (1459-021) and fixed in place by engaging the threaded shaft in it to prevent the end cap from falling during insertion. With the help of screwdriver, turn the end cap in anti-clockwise until the end cap thread aligns with the nail thread. Then rotate the end cap in clockwise direction until it sits in the nail. Unscrew and remove the Screwdriver.



Implant Removal: The socket of end cap is cleared from any sort of tissue ingrowth. Now, engage the Long screwdriver with T-handle (1459-021) to the end cap and rotate it anti-clockwise to remove the end cap. Next, remove all the Distal $\text{\O}4.8$ locking bolts using 3.5mm Hex Screwdriver with T Handle (1459-044). Leave one proximal locking bolt or Anti-rotation screw intact in the nail to prevent the nail rotation while engaging the Impactor-extractor rod(1459-054).



Attach the Impactor-Extractor rod to the open end of the nail and tighten it with the help of Combination wrench, 11mm (1459-057). Remove the last proximal locking bolt from the nail using 3.5mm Hex Screwdriver with T-Handle (1459-044). Take the Sliding hammer ensuring that its head is unlocked and slide it into the Impactor-Extractor rod. Now with the slight backward blows remove the nail from the bone.



Expert Femur Nail

Stainless Steel

	(Left)	(Right)	Dia x Length
Ø9mm	1459-9-320L	1459-9-320R	Ø9mm x 320mm
	1459-9-340L	1459-9-340R	Ø9mm x 340mm
	1459-9-360L	1459-9-360R	Ø9mm x 360mm
	1459-9-380L	1459-9-380R	Ø9mm x 380mm
	1459-9-400L	1459-9-400R	Ø9mm x 400mm
	1459-9-420L	1459-9-420R	Ø9mm x 420mm
	1459-9-440L	1459-9-440R	Ø9mm x 440mm
Ø10mm	1459-10-320L	1459-10-320R	Ø10mm x 320mm
	1459-10-340L	1459-10-340R	Ø10mm x 340mm
	1459-10-360L	1459-10-360R	Ø10mm x 360mm
	1459-10-380L	1459-10-380R	Ø10mm x 380mm
	1459-10-400L	1459-10-400R	Ø10mm x 400mm
	1459-10-420L	1459-10-420R	Ø10mm x 420mm
	1459-10-440L	1459-10-440R	Ø10mm x 440mm
Ø11mm	1459-11-320L	1459-11-320R	Ø11mm x 320mm
	1459-11-340L	1459-11-340R	Ø11mm x 400mm
	1459-11-360L	1459-11-360R	Ø11mm x 360mm
	1459-11-380L	1459-11-380R	Ø11mm x 380mm
	1459-11-400L	1459-11-400R	Ø11mm x 400mm
	1459-11-420L	1459-11-420R	Ø11mm x 420mm
	1459-11-440L	1459-11-440R	Ø11mm x 440mm
Ø12mm	1459-12-320L	1459-12-320R	Ø12mm x 320mm
	1459-12-340L	1459-12-340R	Ø12mm x 340mm
	1459-12-360L	1459-12-360R	Ø12mm x 360mm
	1459-12-380L	1459-12-380R	Ø12mm x 380mm
	1459-12-400L	1459-12-400R	Ø12mm x 400mm
	1459-12-420L	1459-12-420R	Ø12mm x 420mm
	1459-12-440L	1459-12-440R	Ø12mm x 440mm
Ø13mm	1459-13-320L	1459-13-320R	Ø13mm x 320mm
	1459-13-340L	1459-13-340R	Ø13mm x 340mm
	1459-13-360L	1459-13-360R	Ø13mm x 360mm
	1459-13-380L	1459-13-380R	Ø13mm x 380mm
	1459-13-400L	1459-13-400R	Ø13mm x 400mm
	1459-13-420L	1459-13-420R	Ø13mm x 420mm
	1459-13-440L	1459-13-440R	Ø13mm x 440mm

Right

Left



Expert Femur Nail

Titanium

	(Left)	(Right)	Dia x Length
Ø9mm	TI-1459-9-320L	TI-1459-9-320R	Ø9mm x 320mm
	TI-1459-9-340L	TI-1459-9-340R	Ø9mm x 340mm
	TI-1459-9-360L	TI-1459-9-360R	Ø9mm x 360mm
	TI-1459-9-380L	TI-1459-9-380R	Ø9mm x 380mm
	TI-1459-9-400L	TI-1459-9-400R	Ø9mm x 400mm
	TI-1459-9-420L	TI-1459-9-420R	Ø9mm x 420mm
	TI-1459-9-440L	TI-1459-9-440R	Ø9mm x 440mm
Ø10mm	TI-1459-10-320L	TI-1459-10-320R	Ø10mm x 320mm
	TI-1459-10-340L	TI-1459-10-340R	Ø10mm x 340mm
	TI-1459-10-360L	TI-1459-10-360R	Ø10mm x 360mm
	TI-1459-10-380L	TI-1459-10-380R	Ø10mm x 380mm
	TI-1459-10-400L	TI-1459-10-400R	Ø10mm x 400mm
	TI-1459-10-420L	TI-1459-10-420R	Ø10mm x 420mm
	TI-1459-10-440L	TI-1459-10-440R	Ø10mm x 440mm
Ø11mm	TI-1459-11-320L	TI-1459-11-320R	Ø11mm x 320mm
	TI-1459-11-340L	TI-1459-11-340R	Ø11mm x 400mm
	TI-1459-11-360L	TI-1459-11-360R	Ø11mm x 360mm
	TI-1459-11-380L	TI-1459-11-380R	Ø11mm x 380mm
	TI-1459-11-400L	TI-1459-11-400R	Ø11mm x 400mm
	TI-1459-11-420L	TI-1459-11-420R	Ø11mm x 420mm
	TI-1459-11-440L	TI-1459-11-440R	Ø11mm x 440mm
Ø12mm	TI-1459-12-320L	TI-1459-12-320R	Ø12mm x 320mm
	TI-1459-12-340L	TI-1459-12-340R	Ø12mm x 340mm
	TI-1459-12-360L	TI-1459-12-360R	Ø12mm x 360mm
	TI-1459-12-380L	TI-1459-12-380R	Ø12mm x 380mm
	TI-1459-12-400L	TI-1459-12-400R	Ø12mm x 400mm
	TI-1459-12-420L	TI-1459-12-420R	Ø12mm x 420mm
	TI-1459-12-440L	TI-1459-12-440R	Ø12mm x 440mm
Ø13mm	TI-1459-13-320L	TI-1459-13-320R	Ø13mm x 320mm
	TI-1459-13-340L	TI-1459-13-340R	Ø13mm x 340mm
	TI-1459-13-360L	TI-1459-13-360R	Ø13mm x 360mm
	TI-1459-13-380L	TI-1459-13-380R	Ø13mm x 380mm
	TI-1459-13-400L	TI-1459-13-400R	Ø13mm x 400mm
	TI-1459-13-420L	TI-1459-13-420R	Ø13mm x 420mm
	TI-1459-13-440L	TI-1459-13-440R	Ø13mm x 440mm

Right

Left



End Caps For Expert Femur Nail



Stainless Steel	Titanium	Length
1459-01	TI-1459-01	0mm
1459-05	TI-1459-05	5mm
1459-10	TI-1459-10	10mm
1459-15	TI-1459-15	15mm
1459-20	TI-1459-20	20mm

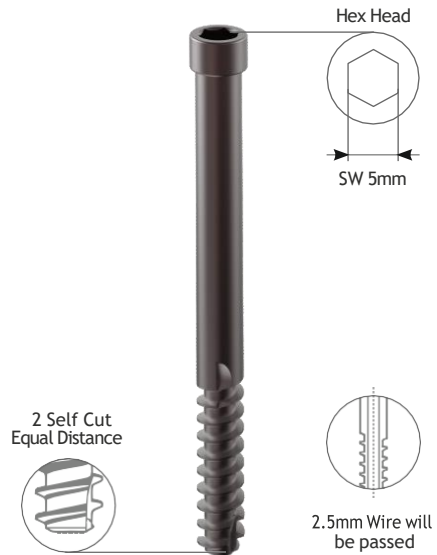
Ø4.8mm Locking Bolt, Self-Tapping, For Expert Femur Nail



Stainless Steel	Titanium	Length (mm)
1458-4.8-026	TI-1458-4.8-026	26
1458-4.8-028	TI-1458-4.8-028	28
1458-4.8-030	TI-1458-4.8-030	30
1458-4.8-032	TI-1458-4.8-032	32
1458-4.8-034	TI-1458-4.8-034	34
1458-4.8-036	TI-1458-4.8-036	36
1458-4.8-038	TI-1458-4.8-038	38
1458-4.8-040	TI-1458-4.8-040	40
1458-4.8-042	TI-1458-4.8-042	42
1458-4.8-044	TI-1458-4.8-044	44
1458-4.8-046	TI-1458-4.8-046	46
1458-4.8-048	TI-1458-4.8-048	48
1458-4.8-050	TI-1458-4.8-050	50
1458-4.8-052	TI-1458-4.8-052	52
1458-4.8-054	TI-1458-4.8-054	54
1458-4.8-056	TI-1458-4.8-056	56
1458-4.8-058	TI-1458-4.8-058	58
1458-4.8-060	TI-1458-4.8-060	60
1458-4.8-062	TI-1458-4.8-062	62
1458-4.8-064	TI-1458-4.8-064	64
1458-4.8-066	TI-1458-4.8-066	66
1458-4.8-068	TI-1458-4.8-068	68
1458-4.8-070	TI-1458-4.8-070	70
1458-4.8-072	TI-1458-4.8-072	72
1458-4.8-074	TI-1458-4.8-074	74
1458-4.8-076	TI-1458-4.8-076	76
1458-4.8-078	TI-1458-4.8-078	78
1458-4.8-080	TI-1458-4.8-080	80
1458-4.8-082	TI-1458-4.8-082	82
1458-4.8-084	TI-1458-4.8-084	84
1458-4.8-085	TI-1458-4.8-085	85
1458-4.8-090	TI-1458-4.8-090	90

Ø6.4mm Cannulated Anti -Rotation Screw, Self-Tapping, For Expert Femur Nail

Stainless Steel	Titanium	Length
1459-060	TI-1459-060	60mm
1459-065	TI-1459-065	65mm
1459-070	TI-1459-070	70mm
1459-075	TI-1459-075	75mm
1459-080	TI-1459-080	80mm
1459-085	TI-1459-085	85mm
1459-090	TI-1459-090	90mm
1459-095	TI-1459-095	95mm
1459-100	TI-1459-100	100mm
1459-105	TI-1459-105	105mm
1459-110	TI-1459-110	110mm
1459-115	TI-1459-115	115mm
1459-120	TI-1459-120	120mm
1459-125	TI-1459-125	125mm
1459-130	TI-1459-130	130mm

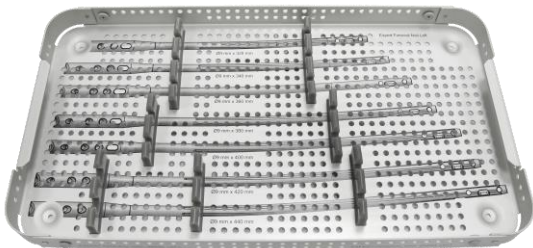


1-014L Implant Box for Expert Femur Nail (Left)



Implant Box (Left)

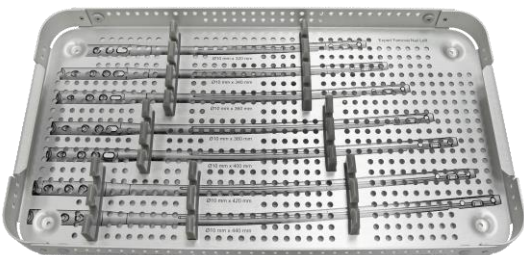
Tray 1



Dia	Length	Qty
Ø9mm	320mm to 440mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

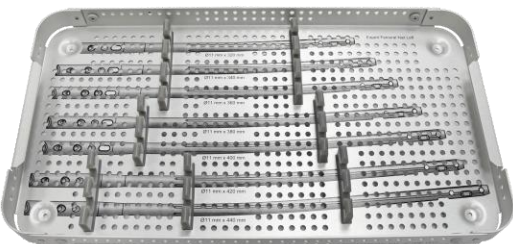
Tray 2



Dia	Length	Qty
Ø10mm	320mm to 440mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

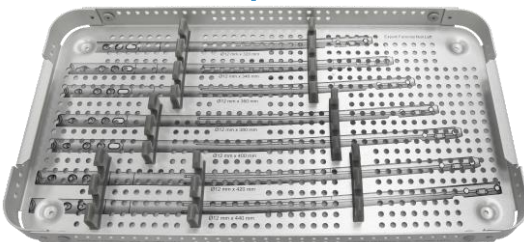
Tray 3



Dia	Length	Qty
Ø11mm	320mm to 440mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

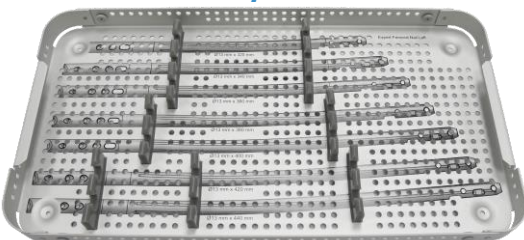
Tray 4



Dia	Length	Qty
Ø12mm	320mm to 440mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

Tray 5



Dia	Length	Qty
Ø13mm	320mm to 440mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

Implant Box (Left)



Ø4.8mm Locking Bolt, Self-Tapping, For Expert Femur Nail

Dia	Length	Qty
Ø4.8mm	26mm to 90mm	5pcs

*Stainless Steel or Titanium Implants
can be placed as per requirement*

Ø6.4mm Cannulated Anti -Rotation Screw, Self-Tapping, For Expert Femur Nail

Dia	Length	Qty
Ø6.4mm	60mm to 130mm	2pcs

*Stainless Steel or Titanium Implants
can be placed as per requirement*

End Caps For Expert Femur Nail

Length	Qty
0mm to 20mm	2pcs

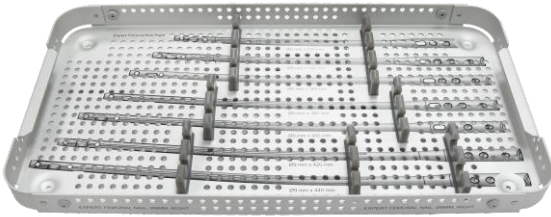
*Stainless Steel or Titanium Implants
can be placed as per requirement*

1-014R Implant Box for Expert Femur Nail (Right)



Implant Box (Right)

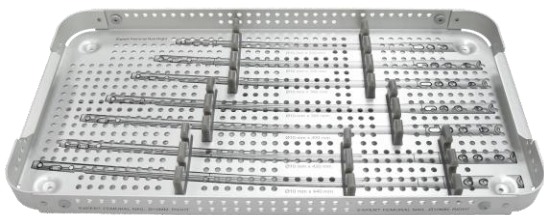
Tray 1



Dia	Length	Qty
Ø9mm	320mm to 440mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

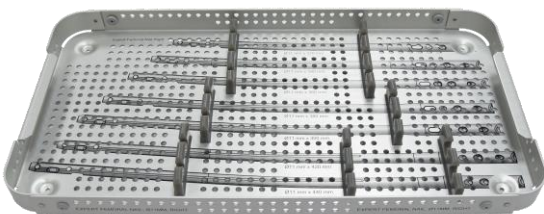
Tray 2



Dia	Length	Qty
Ø10mm	320mm to 440mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

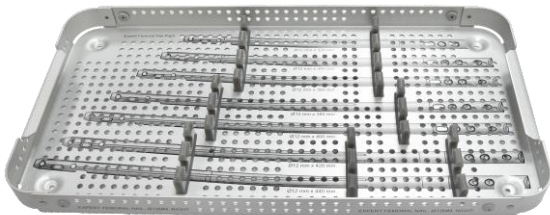
Tray 3



Dia	Length	Qty
Ø11mm	320mm to 440mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

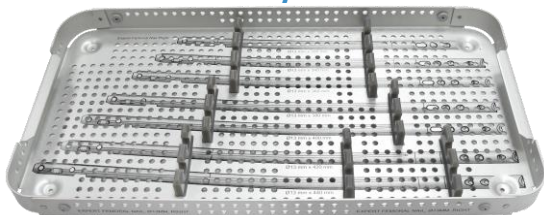
Tray 4



Dia	Length	Qty
Ø12mm	320mm to 440mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

Tray 5



Dia	Length	Qty
Ø13mm	320mm to 440mm	1pcs

Stainless Steel or Titanium Implants can be placed as per requirement

Implant Box (Right)



Ø4.8mm Locking Bolt, Self-Tapping, For Expert Femur Nail

Dia	Length	Qty
Ø4.8mm	26mm to 90mm	5pcs

*Stainless Steel or Titanium Implants
can be placed as per requirement*

Ø6.4mm Cannulated Anti -Rotation Screw, Self-Tapping, For Expert Femur Nail

Dia	Length	Qty
Ø6.4mm	60mm to 130mm	2pcs

*Stainless Steel or Titanium Implants
can be placed as per requirement*

End Caps For Expert Femur Nail

Length	Qty
0mm to 20mm	2pcs

*Stainless Steel or Titanium Implants
can be placed as per requirement*

1459-001 Cannulated Awl for Expert Femur Nail



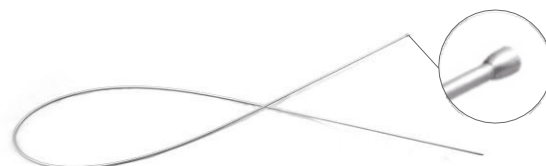
1459-002 Entry Reamer Ø14.3mm for Expert Femur Nail



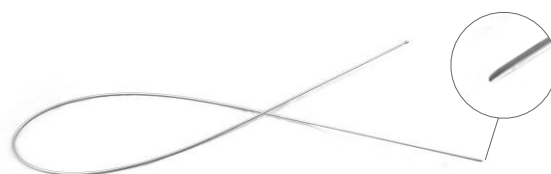
1459-003 T-Handle with Quick Coupling for Entry Reamer - Expert Femur Nail



1459-004 Guide Wire With Ball Tip Ø2.5/3.65mm x Length 1000mm - Nitinol, for Expert Femur Nail



1459-062 Guide Wire Without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Femur Nail



1459-005 Insertion Handle for Expert Femur Nail



1459-006 Flexible Reamer Shaft (AO Connection) for Expert Femur Nail



1459-007 Reduction Rod for Expert Femur Nail



Reamer Head

Code	Dia	Code	Dia
1459-008	Ø8.5mm	1459-014	Ø11.5mm
1459-009	Ø9mm	1459-015	Ø12mm
1459-010	Ø9.5mm	1459-016	Ø12.5mm
1459-011	Ø10mm	1459-017	Ø13mm
1459-012	Ø10.5mm	1459-018	Ø13.5mm
1459-013	Ø11mm	1459-019	Ø14mm



1459-020 Nail Holding Bolt for Expert Femur Nail



1459-021 Long Screwdriver with T-Handle, Hex 5mm, for Expert Femur Nail



1459-022 Sliding Hammer for Expert Femur Nail



1459-023 Proximal Aiming Bar for Expert Femur Nail



1459-024 Locking Bolt For Proximal Aiming Bar - Expert Femur Nail



1459-025 Allen Key, Hex 5mm for Expert Femur Nail



1459-026 Proximal Aiming Device for Expert Femur Nail



1459-027 Distal Aiming Bar for Expert Femur Nail



1459-028 Locking Bolt for Distal Aiming Bar - Expert Femur Nail



1459-029 Distal Targeting Device for Expert Femur Nail



1459-030 Outer Drill Sleeve 10/8.1mm for Distal Targeting Device - Expert Femur Nail



1459-031 Trocar for Sleeve 8.1mm for Distal Targeting Device- Expert Femur Nail



1459-032 Drill Sleeve 8.1/5.2mm for Positioning Rod - Expert Femur Nail



1459-033 Drill Bit Plain Shank/Jacob Chuck End Ø5.2mm x Length 250mm for Expert Femur Nail



1459-034 Ø5.2mm T-Handle Drill Bit with Flat End for Expert Femur Nail



1459-035 Positioning Rod 8.1/5.2mm for Expert Femur Nail



1459-036 Stabilizing Device for Expert Femur Nail



1459-037 Outer Drill Sleeve 11/8.2mm for Expert Femur Nail



1459-038 Trocar Sleeve Ø8.2/2.5mm for Expert Femur Nail



1459-039 Trocar Ø2.5mm for Expert Femur Nail



1459-040 Drill Sleeve 8/4.4mm for Expert Femur Nail



1459-041 Trocar Ø4.3mm for Expert Femur Nail



1459-042 Drill Bit Plain Shank/Jacob Chuck End Ø4.3mm x Length 300mm for Expert Femur Nail



1459-061 Stopper for Ø4.3mm Drill Bit - Expert Femur Nail



7-118-01 Allen Key, Hex 3mm for Expert Femur Nail



1459-043 Depth Gauge measuring upto 90mm for Ø4.8mm Locking Bolt - Expert Femur Nail



1459-044 Screwdriver with T-Handle, Hex 3.5mm for Ø4.8mm Locking Bolt - Expert Femur Nail



1459-045 Universal Screwdriver, Hex 6.5mm, Ball Tip for Nail Holding Bolt- Expert Femur Nail



1459-046 Distal Bolt, Hex 5mm for Distal Targeting Device - Expert Femur Nail



1459-047 Guide Wire with Threaded Tip Ø2.5mm x Thread Length 10mm x Length 338mm



1459-048 Guide Wire, Ø2.5mm x Length 338mm



1459-049 Direct Measuring Device, Length upto 120mm, for Expert Femur Nail



1459-050-1 Tissue Protector for Expert Femur Nail



1459-051 Cannulated Step Drill Bit for Anti-Rotation Screw - Expert Femur Nail



1459-051-1 Stopper for Step Drill Bit - Expert Femur Nail



1459-053 Protection Sleeve 17/14.5mm for Expert Femur Nail



1459-052 Guide Sleeve 14.3/3.2mm for Protection Sleeve - Expert Femur Nail



1459-054 Impactor - Extractor Rod for Expert Femur Nail



1459-055-1 Guide Wire Holder for Expert Femur Nail



1459-056 Distal Screw Device (Static/ Dynamic Locking) for Expert Femur Nail



1459-057 Combination Wrench 11mm for Expert Femur Nail



1459-058 Connecting Rod - Impactor for Expert Femur Nail



1459-058-1 Connecting Block for Connecting Rod - Expert Femur Nail



1459-059 Compression Bolt Ø4mm for Expert Femur Nail



1459-060-1 Guide Pin, Ø3.2mm x Length 480mm



1459-063 Radiographic Ruler for Expert Femur Nail



1459-064 Depth Gauge measuring upto 100mm for Expert Femur Nail



7-010-02 Medullary Exchange Tube



7-010-03 T-Handle for Flexible Reamer (AO Connection)



1459-065T Instrument Trays for Expert Femur Nailing Instrument Set

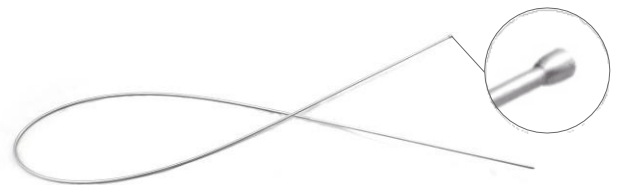


1459-066 Container with PPSU Lid for Expert Femur Nailing Instrument Set

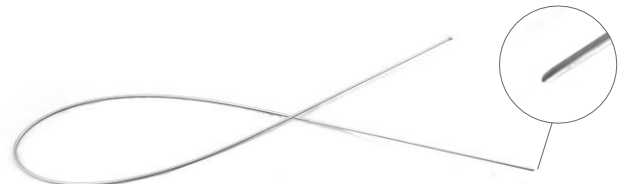


Optional Instruments

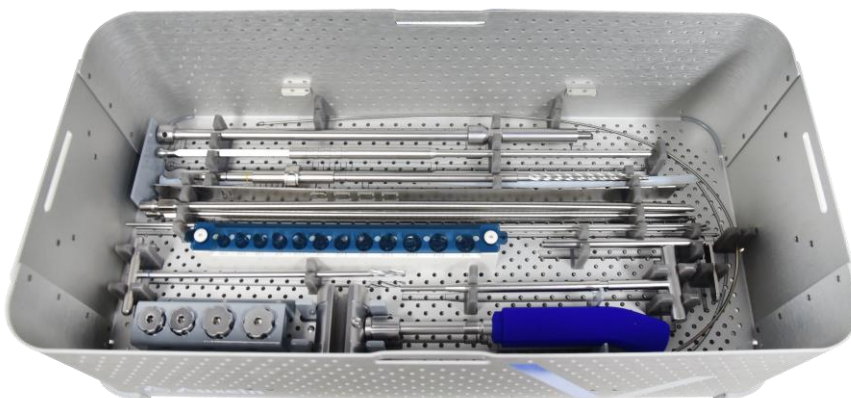
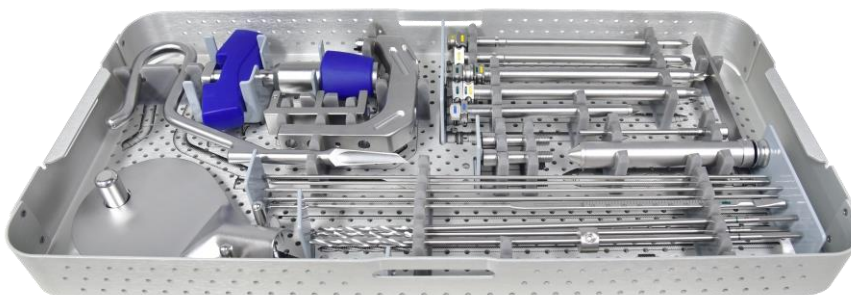
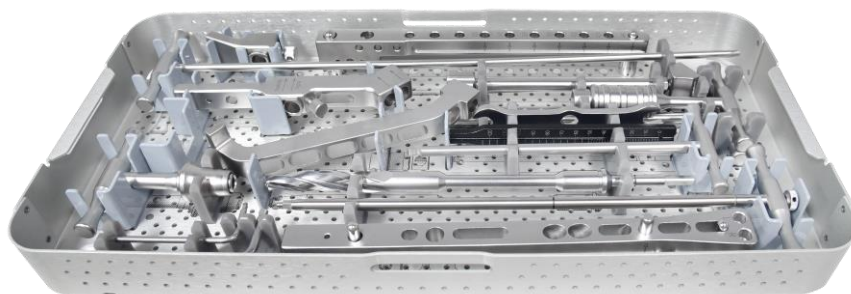
1459-004S Guide Wire With Ball Tip $\varnothing 2.5/3.65\text{mm}$ x Length 1000mm -Stainless Steel, for Expert Femur Nail



1459-062S Guide Wire Without Ball Tip $\varnothing 2.5\text{mm}$ x Length 1000mm -Stainless Steel, for Expert Femur Nail



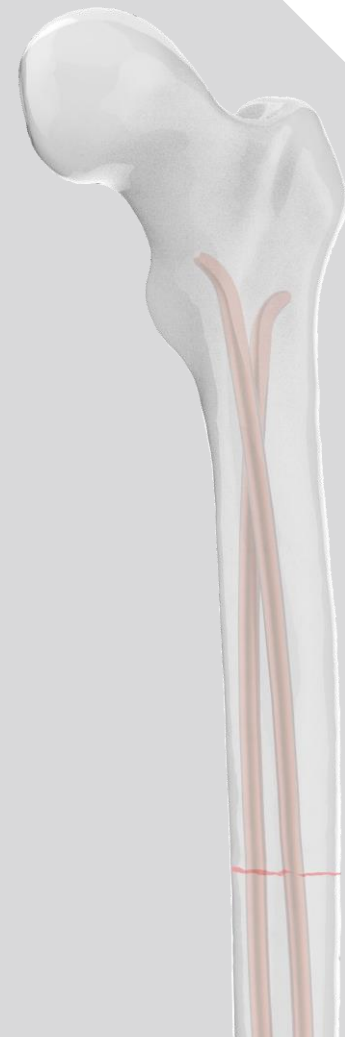
INS-1459 Expert Femur Nailing Instrument Set



INS-1459 Expert Femur Nailing Instrument Set

Code	Set Consisting of	Units
1459-001	Cannulated Awl for Expert Femur Nail	1
1459-002	Entry Reamer Ø14.3mm for Expert Femur Nail	1
1459-003	T-Handle with Quick Coupling for Entry Reamer - Expert Femur Nail	1
1459-004	Guide Wire With Ball Tip Ø2.5/3.65mm x Length 1000mm - Nitinol, for Expert Femur Nail	1
1459-062	Guide Wire Without Ball Tip Ø2.5mm x Length 1000mm - Nitinol, for Expert Femur Nail	1
1459-005	Insertion Handle for Expert Femur Nail	1
1459-006	Flexible Reamer Shaft (AO Connection) for Expert Femur Nail	2
1459-007	Reduction Rod for Expert Femur Nail	1
1459-008	Reamer Head, Ø8.5mm for Expert Femur Nail	1
1459-009	Reamer Head, Ø9.0mm for Expert Femur Nail	1
1459-010	Reamer Head, Ø9.5mm for Expert Femur Nail	1
1459-011	Reamer Head, Ø10.0mm for Expert Femur Nail	1
1459-012	Reamer Head, Ø10.5mm for Expert Femur Nail	1
1459-013	Reamer Head, Ø11.0mm for Expert Femur Nail	1
1459-014	Reamer Head, Ø11.5mm for Expert Femur Nail	1
1459-015	Reamer Head, Ø12.0mm for Expert Femur Nail	1
1459-016	Reamer Head, Ø12.5mm for Expert Femur Nail	1
1459-017	Reamer Head, Ø13.0mm for Expert Femur Nail	1
1459-018	Reamer Head, Ø13.5mm for Expert Femur Nail	1
1459-019	Reamer Head, Ø14.0mm for Expert Femur Nail	1
1459-020	Nail Holding Bolt for Expert Femur Nail	2
1459-021	Long Screwdriver with T-Handle, Hex 5mm, for Expert Femur Nail	1
1459-022	Sliding Hammer for Expert Femur Nail	1
1459-023	Proximal Aiming Bar for Expert Femur Nail	1
1459-024	Locking Bolt For Proximal Aiming Bar - Expert Femur Nail	1
1459-025	Allen Key, Hex 5mm for Expert Femur Nail	1
1459-026	Proximal Aiming Device for Expert Femur Nail	1
1459-027	Distal Aiming Bar for Expert Femur Nail	1
1459-028	Locking Bolt for Distal Aiming Bar - Expert Femur Nail	1
1459-029	Distal Targeting Device for Expert Femur Nail	1
1459-030	Outer Drill Sleeve 10/8.1mm for Distal Targeting Device - Expert Femur Nail	1
1459-031	Trocar for Sleeve 8.1mm for Distal Targeting Device- Expert Femur Nail	1
1459-032	Drill Sleeve 8.1/5.2mm for Positioning Rod - Expert Femur Nail	1
1459-033	Drill Bit Plain Shank/Jacob Chuck End Ø5.2mm x Length 250mm for Expert Femur Nail	1
1459-034	Ø5.2mm T-Handle Drill Bit with Flat End for Expert Femur Nail	1
1459-035	Positioning Rod 8.1/5.2mm for Expert Femur Nail	1
1459-036	Stabilizing Device for Expert Femur Nail	1
1459-037	Outer Drill Sleeve 11/8.2mm for Expert Femur Nail	2

Code	Set Consisting of	Units
1459-038	Trocar Sleeve Ø8.2/2.5mm for Expert Femur Nail	2
1459-039	Trocar Ø2.5mm for Expert Femur Nail	1
1459-040	Drill Sleeve 8/4.4mm for Expert Femur Nail	2
1459-041	Trocar Ø4.3mm for Expert Femur Nail	1
1459-042	Drill Bit Plain Shank/Jacob Chuck End Ø4.3mm x Length 300mm for Expert Femur Nail	3
1459-061	Stopper for Ø4.3mm Drill Bit - Expert Femur Nail	1
7-118-01	Allen Key, Hex 3mm for Expert Femur Nail	1
1459-043	Depth Gauge measuring upto 90mm for Ø4.8mm Locking Bolt - Expert Femur Nail	1
1459-044	Screwdriver with T-Handle, Hex 3.5mm for Ø4.8mm Locking Bolt - Expert Femur Nail	1
1459-045	Universal Screwdriver, Hex 6.5mm, Ball Tip for Nail Holding Bolt- Expert Femur Nail	1
1459-046	Distal Bolt, Hex 5mm for Distal Targeting Device - Expert Femur Nail	2
1459-047	Guide Wire with Threaded Tip Ø2.5mm x Thread Length 10mm x Length 338mm	3
1459-048	Guide Wire, Ø2.5mm x Length 338mm	3
1459-049	Direct Measuring Device, Length upto 120mm, for Expert Femur Nail	1
1459-050-1	Tissue Protector for Expert Femur Nail	1
1459-051	Cannulated Step Drill Bit for Anti-Rotation Screw - Expert Femur Nail	1
1459-051-1	Stopper for Step Drill Bit - Expert Femur Nail	1
1459-053	Protection Sleeve 17/14.5mm for Expert Femur Nail	1
1459-052	Guide Sleeve 14.3/3.2mm for Protection Sleeve - Expert Femur Nail	1
1459-054	Impactor - Extractor Rod for Expert Femur Nail	1
1459-055-1	Guide Wire Holder for Expert Femur Nail	1
1459-056	Distal Screw Device (Static/ Dynamic Locking) for Expert Femur Nail	1
1459-057	Combination Wrench 11mm for Expert Femur Nail	1
1459-058	Connecting Rod - Impactor for Expert Femur Nail	1
1459-058-1	Connecting Block for Connecting Rod - Expert Femur Nail	1
1459-059	Compression Bolt Ø4mm for Expert Femur Nail	1
1459-060-1	Guide Pin, Ø3.2mm x Length 480mm	2
1459-063	Radiographic Ruler for Expert Femur Nail	1
1459-064	Depth Gauge measuring upto 100mm for Expert Femur Nail	1
7-010-02	Medullary Exchange Tube	1
7-010-03	T-Handle for Flexible Reamer (AO Connection)	1
1459-065T	Instrument Trays for Expert Femur Nailing Instrument Set	3
1459-066	Container with PPSU Lid for Expert Femur Nailing Instrument Set	1

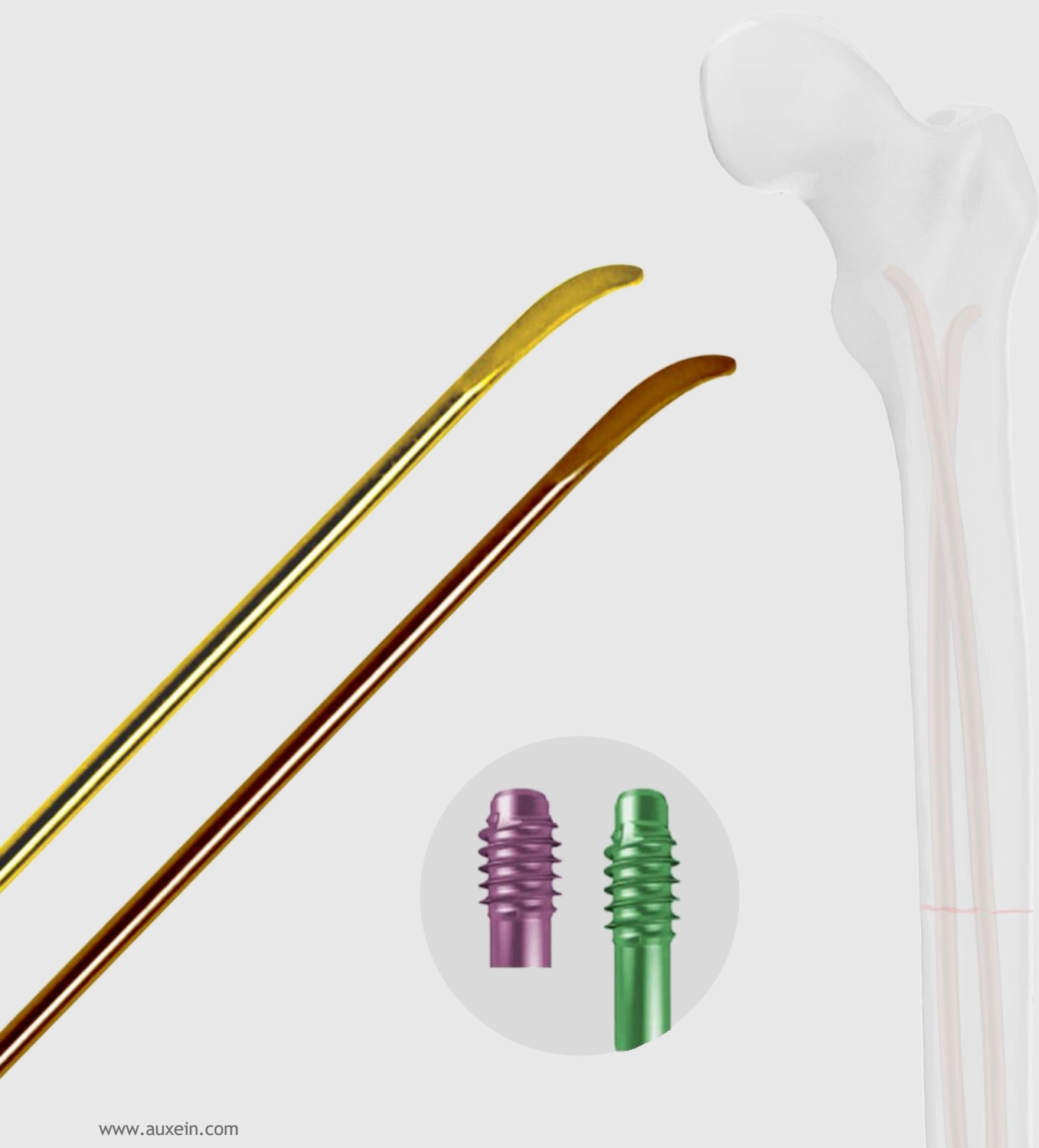


Surgical Technique

Elastic Nailing System

INTRODUCTION

The JAZZMAN *MEDICAL'S* Titanium Intramedullary elastic nail is designed intended for minimally invasive fracture reduction and stabilization appropriate to the age of child. This system is single use implantable device for long term duration (intended for continuous use for more than 30 days).



INDICATIONS:

The Titanium Elastic nail is intended for fixation of diaphyseal fractures with narrow canal including:

- Lower extremity fractures in pediatric and small-statured patients.
- Upper extremity fractures in all patients.



Nail measurement:

The Titanium Elastic Nails are available in Ø1.5mm, Ø2.0mm, Ø2.5mm, Ø3.0mm, Ø3.5mm & Ø4.0mm diameters. In order to determine the required nail diameter, measure the narrowest part of the medullary canal with ruler. The proper nail dia. should not be more than 40% of the width of the narrowest part of medullary canal. In order to prevent malalignment, the two nails of the same dia. will be used to provide the same bending forces and hence nullifying the two forces.

FEMORAL NAIL INSERTION

This Surgical technique describes more commonly used retrograde femoral technique. For Femoral fractures only Ø3.0mm, Ø3.5mm & Ø4.0mm dia. nails are recommended to be used as per the patient anatomy.

Patient positioning: Patient is positioned supine on a fracture table with traction boot. The C-arm is positioned on the lateral side of affected femur for AP and lateral views of leg from knee to hip in such a way to provide access to both lateral and medial aspects of the distal femur. Now reduce the fracture and observe it under the image intensifier in both AP and lateral views.

Nail contouring: Either with hand or the plate bender, nail has to be contoured into an arch shape. This arch shape allows the nail to generate optimal resistance to malaligning forces. It is important to contour both the nail with same curvature for balanced forces.

Note: It is highly advised not to create sharp bending as it could reduce the effectiveness of nail.

Creating Nail Entry point: An incision is made lateral or medial to the distal end of femur, starting 3cm above the physis and distally extending to 2.5cm. Hence the entry point of nail should be 2.5 to 3cm proximal to the physis. There are two different options for creating an entry point as mentioned below:

Option I: With respect to nail size, select the next size drill bit. Insert the Double drill guide 4.5/3.2mm (**3767-4.5**) through the skin incision and advance it until it sits flush with the bone. Through the drill guide insert the selected drill bit. Verify the drill bit position under image intensifier.

Now advance the drill bit and drill the near cortex. Slowly rotate the drill bit to 45° angle while rotating but not advancing in relative to the shaft axis. Continue drilling until it reaches the medullary canal.



Option II: The Awl (**3441-14**) could be used alternatively to open the cortex for providing access to the intramedullary canal. Similar to the drilling technique, rotate the awl along with its 45° motion as described in the adjoining figure. Advance the awl into the cortex at an upward angle.

If using an end cap in order to ensure proper fitment of the end cap, the awl has to be inserted fully into the entry site before nail insertion along with providing a 180° rotation.



Nail insertion: Withdraw the drill bit and introduce the nail into the medullary canal through entry point. Under image intensifier, advance the nail such that the convex side slides along the far cortex in medullary canal.

Attach the Inserter to the nail keeping a nail length of about 150mm between the inserter and entry point and tighten the inserter using key for inserter (**3442-01**). Now attach the Hammer guide (**7-027-01**) to the inserter.



Slide the Sliding Hammer (**3441-12**) into the hammer guide and with the repeated slight hammer blows advance the nail further up the medullary canal and observe it under the image intensifier. Continue with advancing the nail until it reaches to the level of fracture. Similarly open the femur from other end and insert the second nail up to the fracture.

Note: It is advised not to rotate the nail more than 180° during insertion.



Fracture Reduction: To provide reduction on either side of the fracture, the F-Tool for Reduction - Small (**3441-06**) is used. Firstly we need to assemble the F-tool with the Adjustable reductor. Attach the first Adjustable reductor to the one end of the F-Tool. Continue with attaching the second adjustable reductor into the F-Tool such that the assembly fits across the leg. The third reductor will be attached at the opposite end of the F-Tool.

To provide reduction, the assembly is placed on the leg at the level of fracture such that both the reductor provide the required force for reduction.



Once both the nail has reached the level of fracture verify under the image intensifier and advance the one which will effectively pull the proximal fragment in alignment. The nail has to be advanced only to a level such that the reduction is confirmed. Further advancing the nail may displace the proximal fragment making it more difficult to advance the other nail. Confirm the final nail position under image intensifier in both AP and lateral view.

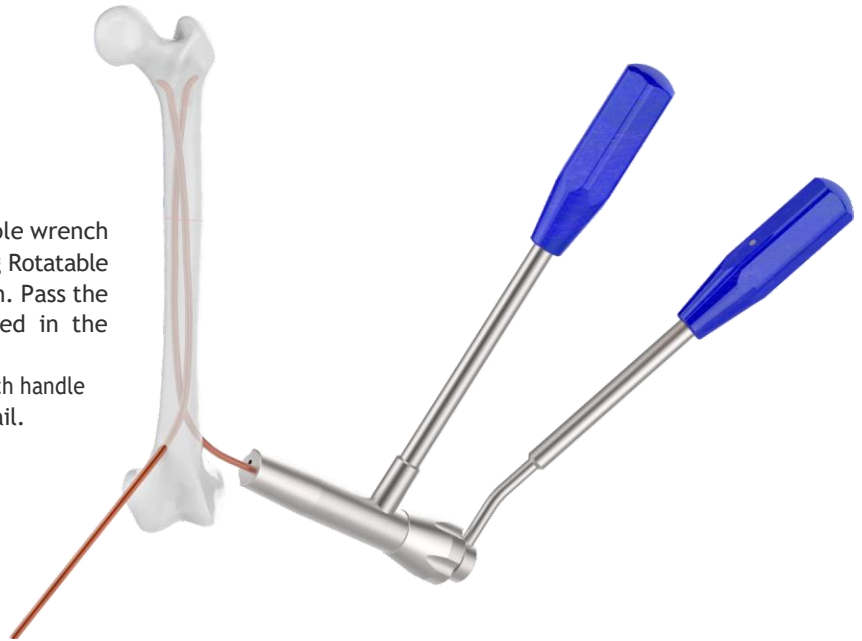
Drive the second nail in the femur using combination of insertor (**3441-03**), Hammer guide (**7-027-01**) & Sliding Hammer (**3441-11**). Continue with advancing of the first nail to a level just below the proximal physis followed by advancing of the second nail to the same level.

Shortening the nail: Once the nail is in its final position mark it at the cutoff point which has to be 10mm - 20mm outside the femoral cortex. Remove the nail outside the incision mark far enough to provide access to the cutoff point.

Note: In case where end cap is used, the cutoff point will be only 10mm outside the femoral cortex.

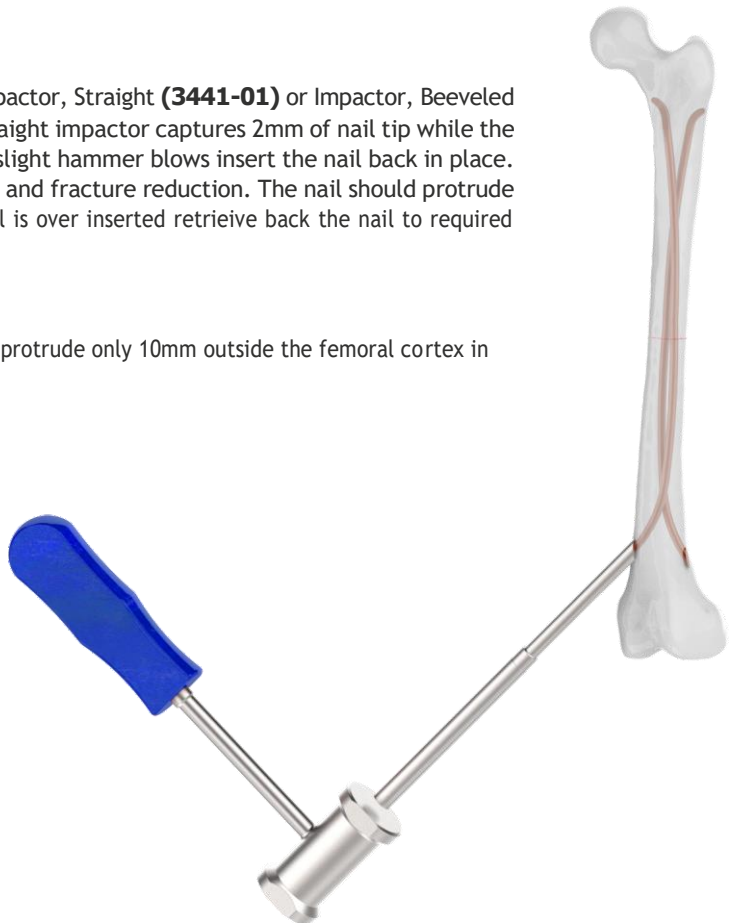
The combination of Cutter (**1243.00**) & Rotatable wrench (**3441-18**) will be used for cutting the nail. Using Rotatable wrench rotate the cutter bolt to an open position. Pass the nail through the appropriate hole as mentioned in the adjoining figure.

Place both the Cutter handle and the rotatable wrench handle and rotate them in opposite direction to cut the nail.



Reinsert the nail back using the combination of Impactor, Straight (**3441-01**) or Impactor, Beeveled (**3441-02**) and the Hammer (**3441-11**). The straight impactor captures 2mm of nail tip while the beveled impactor captures 6mm of nail tip. With slight hammer blows insert the nail back in place. Under Image intensifier confirm final nail position and fracture reduction. The nail should protrude 10mm - 20mm outside the femoral cortex. If the nail is over inserted retrieve back the nail to required position using Plier (**3441-10**).

Note: In case the end cap is being used, the nail will protrude only 10mm outside the femoral cortex in its final position.



End cap insertion: Attach the Insertor (**3441-03**) to the triangle wrench for end cap (**3441-15**). The end cap will be inserted in an oblique orientation in the bone. Select the suitable end cap and place it over the nail. With the clockwise rotation of the wrench tight the end cap into the bone for final seating. The threaded portion of the end cap must be fully inserted in to the bone.



Implant Removal: Make a skin incision and dissect to expose the end cap. Attach the Insertor (**3441-03**) to the triangle wrench for end cap (**3441-15**). Remove any bone overgrowth and with the help of triangle wrench remove the end cap by rotating it in anti-clockwise direction.

Hold the exposed end of nail using plier (**3441-10**). Screw in the Hammer guide (**7-027-01**) into the plier. Slide the sliding hammer (**3441-12**) into the hammer guide and with light blows remove the nail from the bone.



TIBIA NAIL INSERTION

For Pediatric tibial fracture usually two nails are inserted with antegrade approach from lateral and medial side of the bone. The nail from Ø2.5mm to Ø4.0mm are used depending on the patient anatomy. The entry point for the same will be few centimeters distal to the physis at anterolateral and anteromedial location.

HUMERAL NAIL INSERTION

The Titanium elastic nail could also be used for fixation of humeral fractures in both adult as well as children. For this purpose nail diameters ranging between Ø2.5mm and Ø3.5mm are used for fixation depending on the patient anatomy. The nail could be inserted using both antegrade as well as retrograde technique. For retrograde technique, the entry point is posterolateral off the lateral supercondylar ridge where one hole is above another. Whereas for the antegrade technique, entry points are located on the lateral humerus at level with the attachment point of the deltoid muscle.

FOREARM NAIL INSERTION

Unlike other nail insertion techniques, in the forearm mostly single nail is sufficient for fracture reduction. The nail diameters normally range from Ø2.0mm to Ø3.0mm depending on the patient anatomy. The nail could be inserted using the antegrade or the retrograde approach. It is advised to follow the retrograde approach for nail placement in radius and the antegrade approach for nail placement in the ulna.

Titanium Elastic Nail



Size					
$\varnothing 1.5\text{mm} \times 440\text{mm}$	$\varnothing 2.0\text{mm} \times 440\text{mm}$	$\varnothing 2.5\text{mm} \times 440\text{mm}$	$\varnothing 3.0\text{mm} \times 440\text{mm}$	$\varnothing 3.5\text{mm} \times 440\text{mm}$	$\varnothing 4.0\text{mm} \times 440\text{mm}$
Code					
412-1.5-044	412-2.0-044	412-2.5-044	412-3.0-044	412-3.5-044	412-4.0-044

End Cap for Titanium Elastic Nail

Size	
$\varnothing 3.0\text{mm}-4.0\text{mm}$	$\varnothing 1.5\text{mm}-2.5\text{mm}$
Code	
412E-1C	412E-2C



7-027-06

Drill Bit Plain Shank/Jacob Chuck End, Ø2.7mm x Length 115mm, for Elastic Nail



7-027-04

Drill Bit Plain Shank/Jacob Chuck End, Ø3.2mm x Length 150mm, for Elastic Nail



7-027-05

Drill Bit Plain Shank/Jacob Chuck End, Ø4.5mm x Length 150mm, for Elastic Nail



3441-01

Impactor for Elastic Nail, Straight



3441-02

Impactor for Elastic Nail, Beveled



3441-03

Inserter for Elastic Nail



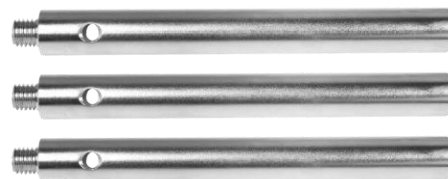
3441-04 Awl, Curved, Length 180mm for Clavicular Fractures



3441-06 F-Tool for Reduction - Small, for Elastic Nail



7-027-07 Adjustable Reductor for Elastic Nail



3441-10 Plier for Elastic Nail



7-027-08 Double Drill Guide Ø4.5/3.2mm for Elastic Nail



1243-000 Cutter for Elastic Nail



7-027-03 Rotatable Wrench (For Cutter), for Elastic Nail



3441-11 Hammer for Elastic Nail



3441-12 Sliding Hammer for Elastic Nail



3441-13 Pin Wrench, $\Phi 4.5\text{mm}$, for Elastic Nail



3441-14 Awl for Elastic Nail



7-027-09 Driver for End Cap, for Elastic Nail



7-027-01 Hammer Guide for Elastic Nail



7-027-10 Extraction Rod for Elastic Nail



7-027-02 Triangle Wrench for End Cap, Large, for Elastic Nail



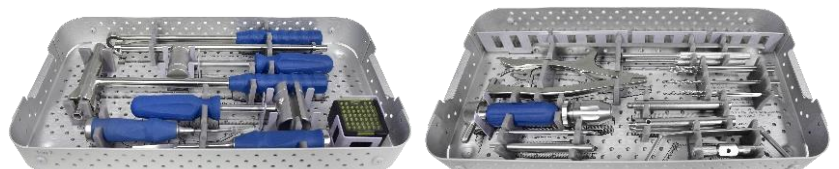
3441-15 Triangle Wrench for End Cap, Small, for Elastic Nail



3442-02 Caddy for End Cap, for Elastic Nail



3442-03 Instrument Trays for Elastic Nailing Instrument Set



A10-028 Container For Elastic Nailing Instrument Set



5002-000 Elastic Nailing Instrument Set



5002-000 Elastic Nailing Instrument Set

Codes	Set Consisting of:	Units
7-027-06	Drill Bit Plain Shank/Jacob Chuck End, Ø2.7mm x Length 115mm, for Elastic Nail	2
7-027-04	Drill Bit Plain Shank/Jacob Chuck End, Ø3.2mm x Length 150mm, for Elastic Nail	2
7-027-05	Drill Bit Plain Shank/Jacob Chuck End, Ø4.5mm x Length 150mm, for Elastic Nail	2
3441-01	Impactor for Elastic Nail, Straight	1
3441-02	Impactor for Elastic Nail, Beveled	1
3441-03	Insertor for Elastic Nail	1
3441-04	Awl, Curved, Length 180mm for Clavicular Fractures	1
3441-06	F-Tool for Reduction - Small, for Elastic Nail	1
7-027-07	Adjustable Reductor for Elastic Nail	3
3441-10	Plier for Elastic Nail	1
7-027-08	Double Drill Guide Ø4.5/3.2mm for Elastic Nail	1
1243-000	Cutter for Elastic Nail	1
7-027-03	Rotatable Wrench (For Cutter), for Elastic Nail	1
3441-11	Hammer for Elastic Nail	1
3441-12	Sliding Hammer for Elastic Nail	1
3441-13	Pin Wrench, Ø4.5mm, for Elastic Nail	1
3441-14	Awl for Elastic Nail	1
7-027-09	Driver for End Cap, for Elastic Nail	1
7-027-01	Hammer Guide for Elastic Nail	1
7-027-10	Extraction Rod for Elastic Nail	1
7-027-02	Triangle Wrench for End Cap, Large, for Elastic Nail	1
3441-15	Triangle Wrench for End Cap, Small, for Elastic Nail	1
3442-02	Caddy for End Cap, for Elastic Nail	1
3442-03	Instrument Trays for Elastic Nailing Instrument Set	2
A10-028	Container For Elastic Nailing Instrument Set	1