# tibia EasyLOC Nail Easy Targeting System for Distal Locking

Orthopedic Implants

# Introductions

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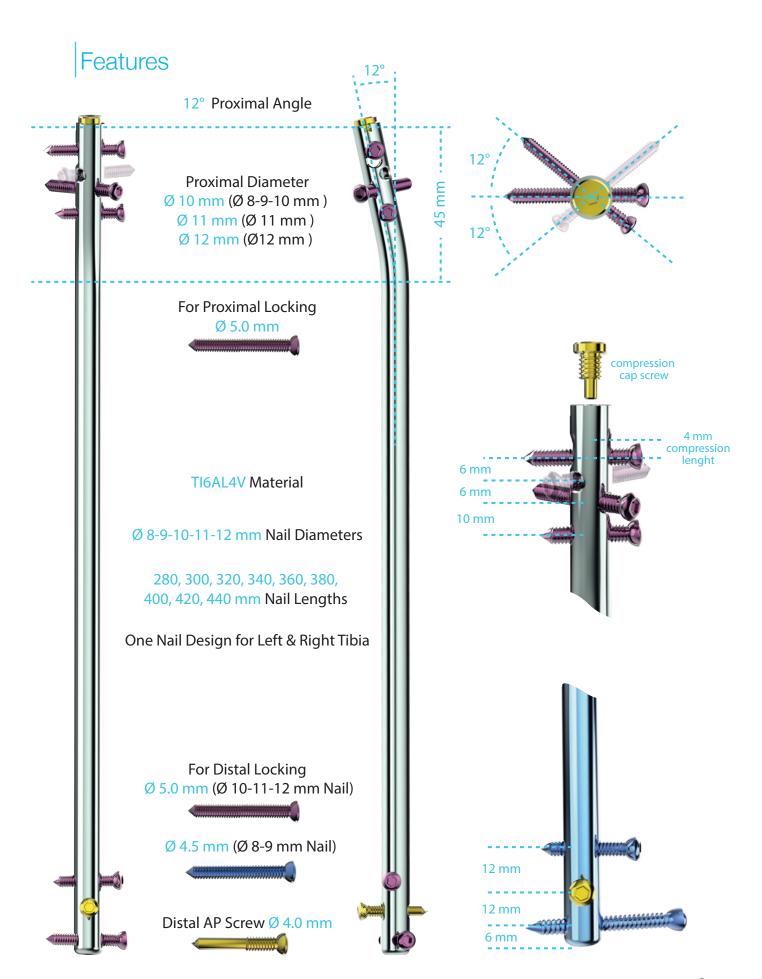
Easy Lock Intramedullary Tibia Nail has matching anatomic design for Tibia fractures and updated distal locking system. By this mean Easy Lock Intramedullary Tibia Nail can be used for most of the tibia fractures and also reduces fluoroscopy time. Because of the multi-directional proximal and distal locking choices, it provides high stability. Its biomechanical strength is improved with the nail and locking screws which made from a biocompatible titanium material.

This nail makes possible to fix tibial fractures even if they are positioned too distally, through its distal locking screw holes.

It makes easier to surgery and reduces surgery time because of the perfect accommodation between instruments and implant.

### Indications

EasyLOCK Tibia Nail could be used for all tibia fractures between 4.5 cm distal from proximal diarthrosis to 2.5 cm proximal of distal diarthrosis. It also can be used for malunions or nonunions, shortening osteotomies and tumor resections. EasyLOCK Tibia Nail is effective to prophylactic nail use of pathological fractures.



# Surgical Technique

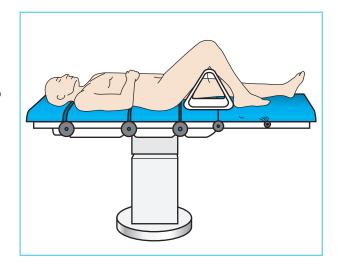
Before the surgery, two-sided preoperative radiographies of the healthy tibia are taken from 1 mt distance. The diameter of the narrowest region of the medullary cavity is measured. Approximately 10 % enlargement ratio is calculated and subtracted.

The nail diameter must be 1-1.5 mm smaller than narrowest region.

In order to determine the length of the nail, Tibia length is measured between joints, approximately 10 % enlargement ratio is calculated and subtracted. Before determining the length of nail extra 2 cm is subtracted.

## POSITION OF PATIENT

The patient is positioned on radiolucent operation table supine and target extremity is angled 85°. The length and rotation of this extremity are compared to healthy extremity.

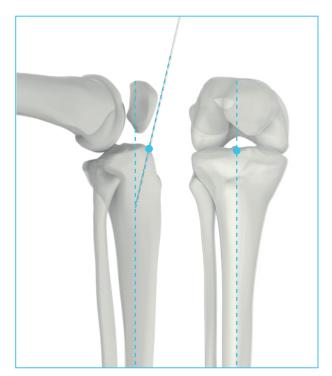


## 2 NAIL'S ENTRY POINT

We have two approaches;

In proximal, standard medial parapatellar or anterior 5 cm longitudinal incision.

Usually axis of medullary cavity is on the same level with the lateral tibial eminence.





On the side view, as the tip of the *Awl* positioned to the front edge of the tibial plateau, the entry point for the medullary cavity would be the center of the anterior intercondylar region on AP (medullary cavity extention).



As another method; in lateral view, from entry point 3x300 mm K-wire is applied at the angle of 12° to shaft axis over K-wire Sleeve, then 6-7 cm nail entry into the proximal tibia can be opened by using the Entry Reamer.

Alternatively, *The Cannulated Awl* can be used for opening an entry point for bone.

*K-wire, Reamer or Awl* shouldn't touch to posterior cortex.

The Olive-Headed Guide Wire (2.5X900mm) is applied through intramedullary cavity until 1 cm proximal of the tarsus.

The entry point shouldn't be more distal than 1 cm from anterior edge of tibial plateau.



## 3 REDUCTION

When the *Guide Wire* is being applied in order to pass fracture line easily and to help reduction, *The Reduction Instrument* with *T-Holder* can be used. Before using the *Reduction Instrument*, proximal fragment should be reamed with *Ø10 mm Reamer*. With the *Wire Holder*, the guide wire is advanced until tibial distal. The right position of the olive head of guide wire on distal is checked with fluoroscopy.



## 4 DETERMINING THE NAIL LENGTH

At this stage, the nail length is determined with the *Nail Gauge* instrument on the wire that left out of the bone.

If the reamer-free technique will be used, the proper nail that attached to *Nail Inserter* is placed in the cavity through *Guide Wire*.

But if necessary, the diameter of the medullary cavity can be increased with reamers.



## 5 REAMING MEDULLARY CAVITY

*Reamer* consists of two parts; *Flexible Shaft* and *Reamer Head*. There are 12 different diameters from 7.5 mm to 13 mm for *Reamer Heads*.

**Reamer Head** is attached to the tip of the flexible shaft as in visual and applied through **The Olive Head Guide** to medullary cavity.





The reaming process begins with the smallest *Reamer (Ø 7,5 mm)* and *Reamer Sleeve* through *Guide Wire.* The operation proceeds by 0.5 mm increments on *Reamer Heads*.

While taking *Reamer* back, in order to prevent taking out of the wire, *Guide Wire Inserter* can be used from the back of the power drill.

The reaming process is continued until the cortex touch is felt. The diameter of the nail that we will use should be 1-1.5 smaller than the last *Reamer* we used.



## 6 ASSEMBLING the NAIL and the NAIL INSERTER

The nail that we will use is attached to the *Nail Inserter* as in the picture and the other instruments are checked.

The Nail is attached to the *Inserter* with *Nail-Inserter Connection Bolt* as in the picture. The bolt is tightened with *5 mm T-Screwdriver*.





## 7 INSERTING THE NAIL

The Nail that attached to the Inserter is advanced along the cavity through *Guide Wire*. The fractured line is passed and the nail is inserted until proper distal level by manually.



In the case of need to impact, the *Sliding Hammer* is set to inner threaded part on top of the *Nail Inserter Connection Bolt*. This connection is tightened with *12 mm Wrench*. It should be lightly impacted with sliding mallet.

You shouldn't beat to the *Nail Inserter* with the *Hammer* directly.

Despite light impacts, if the *Nail* still doesn't move, the impact should be stoped. The *Nail* should remove and one larger diameter of the *Reamer* or one smaller diameter of the *Nail* should be tried.

## 8 DISTAL LOCKING

The *Extension Arm* is set on the *Nail Inserter* with *Connection Screw* as in the picture, while the laser marker for the length of the nail is proximal and on the level of *Connection Screw*. If necessary it should be tightened with *12 mm Wrench*.



The *Distal Locking Guide* is assembled in its position on distal of the *Extension Arm* so as to be medial of the tibia. To tighten this assembly, the *Immobilization Guide* is connected with the *12 mm Wrench*.

K-Wire Sleeve is placed into the Immobilization Guide, 2x250 mm K-Wire is applied to the AP hole of the Nail. Before this process to open AP hole; 2.5x900 mm Guide Wire inside the nail cavity should be taken back for 3 cm. The AP hole should be checked with 900 mm Guide Wire if the 2x250 mm K-Wire is inside. If necessary the fluoroscopy control should be made. After the confirmation, 900 mm Guide Wire is removed away.





Then the *K-Wire Sleeve* is taken back and *5.0 mm Drill Sleeve* is put on. It is forwarded until bone surface with skin cut and blunt dissect. Only the first cortex is drilled with *5.0 mm Drill* and the *Nail* is reached through the *K-Wire*.

*Drill* and *Drill Sleeve* is removed. *AP Block* directly related to the nail diameter is set on *The Immobilization Guide*.



There are five different blocks which is colored with the same color with the nail according to nail diameter. These blocks determine the distance between the nail and distal locking system according to different nail diameters.





*T-Shaped Immobilization Rod* is applied to AP hole of the nail through the *Block* and the *Immobilization Guide*. *The Immobilization Rod* should be slightly pushed while it is turned clockwise in order to make a right catching. The correct contact should be maintained until the *Distal Locking Screw* is placed.

In order to distal locking, *Screw Sleeve* and *Trocar* are placed to distal one of the two screw holes on the *Distal Locking Guide*. A cut is opened on the skin at the projection of the *Trocar*. The *Screw Sleeve* is forwarded with *Trocar* until the cortex touching.

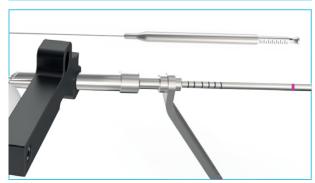


The *Trocar* is removed and *Drill Sleeve* is placed. At this point, the correct *Drill* and *Drill Sleeve* should be used according to the diameter of the *Distal Locking Screw* which changes by the diameter of the nail.

For the 8 mm and 9 mm nails, 4.5 mm distal locking screws is used hence 3.5 drills should be used. On the other hand, 5.0 mm distal locking screw is used for 10 mm, 11 mm and 12 mm nails. Therefore 4.2 mm drill should be used for these nails.

The length of the screw can be measured with the markers on the *Drill*. Also, the *Depth Gauge* which is in the set can be used for this (though *Drill Guide*).





*Drill* and *Drill Sleeve* is removed. *Distal Locking Screw* that had been determined is applied with 3.5x180 mm *Quick Handler Screwdriver*. The screw is placed to the bone till the laser marker on the *Screwdriver* aligns with the *Sleeve*.



The second screw on distal is placed with the same method that described above.

PS: In the case of The AP technique that described above can not be applied for distal locking, free locking technique can be used.





After distal locking is completed; the *Immobilization Rod, Sleeves, Distal Aiming Rod* and the *Extension Arm* can be removed from the system.

If it is necessary, *AP Screw* can be applied to the AP hole. In order to *AP Screw* could be forwarded till the second cortex, the next cortex should be drilled with *4.2 mm Drill*.



## 9 PROXIMAL LOCKING

Before proximal locking, distraction and malrotation of the fracture line, and alignment of the extremity should be checked.

In the case of the distracted bone fracture the gap can be closed by slightly tabbing on the *Connection Bolt* with the *Sliding Hammer* (reverse direction).



The *Proximal Aiming Guide* is placed medially or laterally to the gap on the *Nail Inserter* as in the picture. The *Connection Bolt* is tightened with *12 mm Wrench*.

There are 3 static and 1 dynamic holes for proximal locking options.

If primer compression, dynamisation or auto compression is necessary oval holes should be used. Otherwise, static holes could be used.



Considering fracture and its position, *Screw Sleeve* and *Trocar* is placed to the proper hole on the proximal of the bone. A cut is opened on the skin at the projection of the *Trocar*. The *Screw Sleeve* is forwarded with *Trocar* until the cortex touching. The *Trocar* is removed and *4.2 mm Drill* is placed. With this instrument double cortex is drilled.

5.0 mm Screw is used on the proximal of the nails.

The length of the screw can be measured with the markers on the *Drill*. Also, the *Depth Gauge* which is in the set can be used for this (Through *Drill Guide*).

*Drill* and *Drill Sleeve* is removed. *Proximal Locking Screw* that had been determined is applied with 3.5x180 mm Quick Handler Screwdriver. The screw is placed to the bone till the laser marker on the *Screwdriver* aligns with the *Sleeve*.



#### Static Locking

From anteromedial to posterolateral or static locking (mediolateral)





#### Dynamic Locking

If compression will be necessary only the proximal one of the two holes on the *Proximal Aiming Guide* should be used. (Dynamic Hole) The same method that described above is followed for applying the locking screw. After that, from AP and Lateral Scopy confirmation is made for the status of fracture, position, and length of the screws.



Aiming Guide and Inserter is removed. Compression Screw is applied to the top of the nail with 3.5x180 mm Quick Handler Screwdriver. Compression Screw makes compression to the Proximal Locking Screw in the dynamic hole and pushes it to distal. This way 4 mm compression is achieved.

If there is no need for compression the other *Lengthening Screws* can be used. They are in 5 mm, 10 mm, 15 mm, 20 mm sizes.

The incision could be closed with the usual methods.



#### Attention!

Some of important surgical technique details that should be considered as;

In preparation for surgery two-sided graphy of healthy tibia should be taken and bone anatomy should be examined carefully. It must be looked if there is a too narrow medullar cavity or too much anterior bowing, then the nail diameter should be determined.

The nail entry point should be choosen carefully.

The nail should be moved manually from metaphysical area to cortical area.

In partial fractures, it should be taken into consideration that distal main fragment can be closed or narrowed with a piece.

During the nail is being applied to the distal it should be kept in mind that the Nail inserter or nail connection bolt can be loosened.

## Removing of the Nail

The instruments for extraction are 3.5 mm Screwdriver, 12 mm Wrench and The Sliding Hammer.

The *Lengthening Screw* is extracted with *3.5 mm Screwdriver*. The inner threaded head of the *Sliding Hammer* is inserted to the threaded top of the nail than tightened with *12 mm Wrench*. All of the locking screws are extracted with *3.5 mm Screwdriver*. With the reverse impacts the *Sliding Hammer* is used for the extraction of the nail.

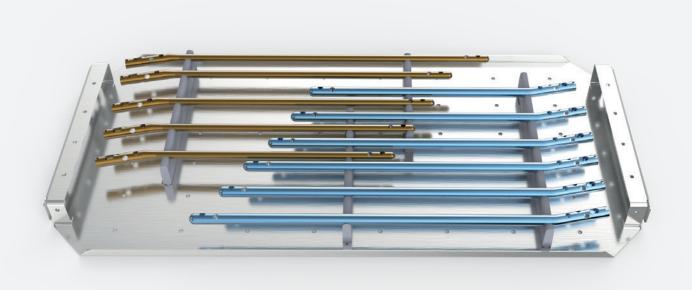




# Set Detail

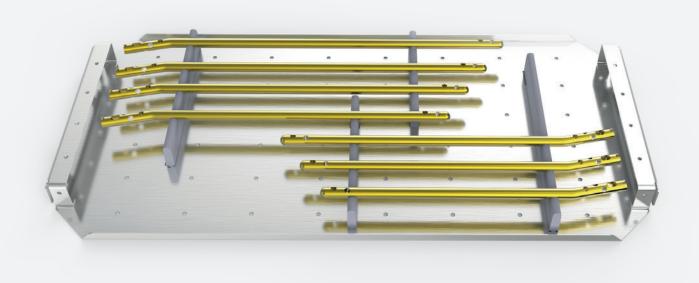
# Implant Tray 1 (Ø 8-9 mm)

code	barcode	description	qty
81620108280	8680858420728	EASY LOCK. TIN 8X280 MM TI	1
81620108300	8680858420735	EASY LOCK. TIN 8X300 MM TI	1
81620108320	8680858420742	EASY LOCK. TIN 8X320 MM TI	1
81620108340	8680858420759	EASY LOCK. TIN 8X340 MM TI	1
81620108360	8680858420766	EASY LOCK. TIN 8X360 MM TI	1
81620109280	8680858427659	EASY LOCK. TIN 9X280 MM TI	1
81620109300	8680858420780	EASY LOCK. TIN 9X300 MM TI	1
81620109320	8680858420797	EASY LOCK. TIN 9X320 MM TI	1
81620109340	8680858420803	EASY LOCK. TIN 9X340 MM TI	1
81620109360	8680858420810	EASY LOCK. TIN 9X360 MM TI	1
81620109380	8680858420827	EASY LOCK. TIN 9X380 MM TI	1
407100	8680858432899	EASY LOCK. TIN IMPLANT TRAY 1	1



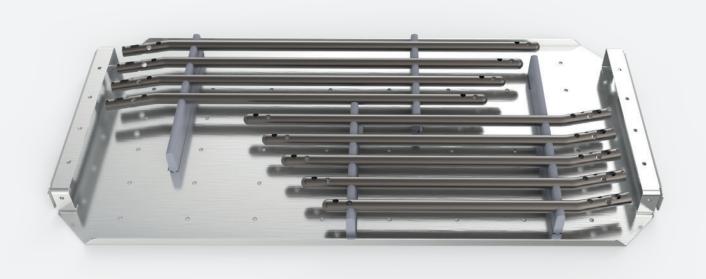
# | Implant Tray 2 (Ø 10 mm)

code	barcode	description	qty
81620110280	8680858427697	EASY LOCK. TIN 10X280 MM TI	1
81620110300	8680858420834	EASY LOCK. TIN 10X300 MM TI	1
81620110320	8680858420841	EASY LOCK. TIN 10X320 MM TI	1
81620110340	8680858420858	EASY LOCK. TIN 10X340 MM TI	1
81620110360	8680858420865	EASY LOCK. TIN 10X360 MM TI	1
81620110380	8680858420872	EASY LOCK. TIN 10X380 MM TI	1
81620110400	8680858420889	EASY LOCK. TIN 10X400 MM TI	1
407200	8680858432905	EASY LOCK. TIN IMPLANT TRAY 2	1



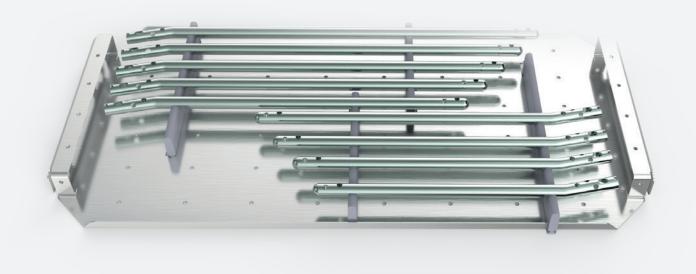
# Implant Tray 3 (Ø 11 mm)

code	barcode	description	qty
81620111280	8680858427727	EASY LOCK. TIN 11X280 MM TI	1
81620111300	8680858420896	EASY LOCK. TIN 11X300 MM TI	1
81620111320	8680858420902	EASY LOCK. TIN 11X320 MM TI	1
81620111340	8680858420919	EASY LOCK. TIN 11X340 MM TI	1
81620111360	8680858420926	EASY LOCK. TIN 11X360 MM TI	1
81620111380	8680858420933	EASY LOCK. TIN 11X380 MM TI	1
81620111400	8680858420940	EASY LOCK. TIN 11X400 MM TI	1
81620111420	8680858420957	EASY LOCK. TIN 11X420 MM TI	1
81620111440	8680858420964	EASY LOCK. TIN 11X440 MM TI	1
407300	8680858432912	EASY LOCK. TIN IMPLANT TRAY 3	1

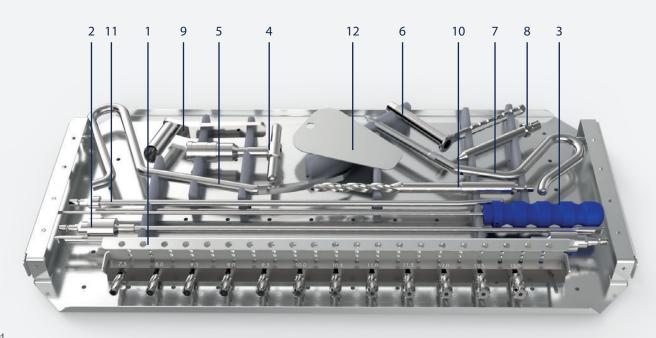


# Implant Tray 4 (Ø 12 mm)

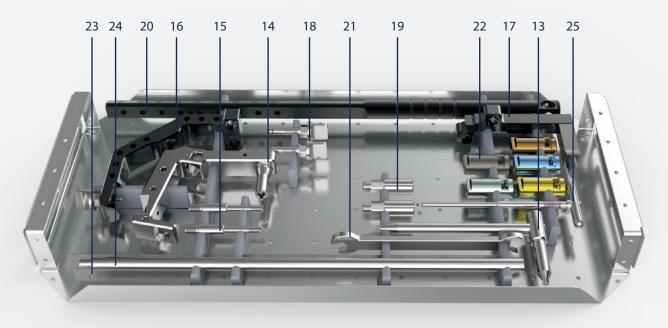
code	barcode	description	qty
81620112280	8680858427734	EASY LOCK. TIN 12X280 MM TI	1
81620112300	8680858427741	EASY LOCK. TIN 12X300 MM TI	1
81620112320	8680858420971	EASY LOCK. TIN 12X320 MM TI	1
81620112340	8680858420988	EASY LOCK. TIN 12X340 MM TI	1
81620112360	8680858420995	EASY LOCK. TIN 12X360 MM TI	1
81620112380	8680858421008	EASY LOCK. TIN 12X380 MM TI	1
81620112400	8680858421015	EASY LOCK. TIN 12X400 MM TI	1
81620112420	8680858421022	EASY LOCK. TIN 12X420 MM TI	1
81620112440	8680858421039	EASY LOCK. TIN 12X440 MM TI	1
407400	8680858432929	EASY LOCK. TIN IMPLANT TRAY 4	1



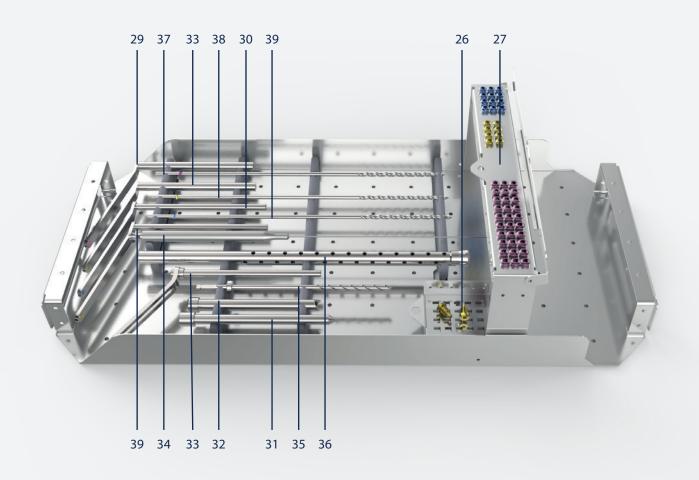
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1	00000803100	8680858431267	REAMING HEADS TRAY	1
	08010200075	8680858432189	REAMER HEAD 7.5 MM	1
	08010200080	8680858432196	REAMER HEAD 8.0 MM	1
	08010200085	8680858432202	REAMER HEAD 8.5 MM	1
	08010200090	8680858432219	REAMER HEAD 9.0 MM	1
	08010200095	8680858431359	REAMER HEAD 9.5 MM	1
	08010200100	8680858432226	REAMER HEAD 10.0 MM	1
	08010200105	8680858432233	REAMER HEAD 10.5 MM	1
	08010200110	8680858432240	REAMER HEAD 11.0 MM	1
	08010200115	8680858432257	REAMER HEAD 11.5 MM	1
	08010200120	8680858432264	REAMER HEAD 12.0 MM	1
	08010200125	8680858432271	REAMER HEAD 12.5 MM	1
	08010200130	8680858432288	REAMER HEAD 13.0 MM	1
2	08021046050	8680858432325	FLEXIBLE REAMER SHAFT 5X460 MM	2
3	08011000000	8680858432318	PUSH ROD	1
4	02171000017	8698673440876	REAMER T HANDLE	1
5	08201000003	8698673496248	AWL	1
6	07360000004	8680858424009	TIN REAMER SLEEVE	1
7	01610000012	8680858424511	INTRAMED. NAIL CANNULE AWL	1
8	01610000010	8680858424214	INTRAMED. NAIL K-WIRE GUIDE Ø3X105MM	1
9	08201100001	8680858432417	INTRAMED. NAIL ENTRY REAMER SLEEVE Ø10X80MM	1
10	08050002012	8680858432745	INTRAMED. NAIL ENTRY REAMER Ø9X210MM	1
11	04361840040	8680858431991	TIN REDUCTION DEVICE 4x8x400 MM	1
12	08050000010	8698673496170	PATELLA PROTECTOR	1
	210100	8680858432936	EASY LOCK. TIN INSTRUMENT TRAY 1	1



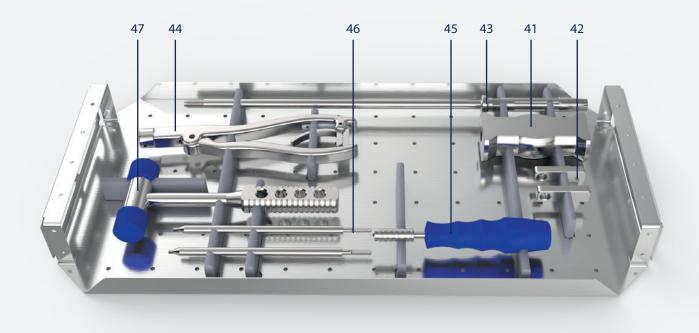
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13	02025100500	8699931005172	T-SCREW DRIVER 5 MM	1
14	01610000030	8680858424269	EASY LOCK TIN INSERTION HANDLE	1
15	01610000035	8680858424276	NAIL-HANDLE CONNECTION SCREW	2
16	01610000040	8680858424283	EASY LOCK.TIN PROX. TARGETING ARM	1
17	01610000045	8680858424290	EASY LOCK.TIN DISTAL TARGETING ARM	1
18	01150200560	8680858431380	HANDLE ARM CONNECTION BOLT	2
19	01610000060	8680858424313	STABILIZING SLEEVE	2
20	01610000075	8680858424344	INSERTION HANDLE EXTENSION ARM	1
21	08044000012	8699931015744	WRENCH Ø 12 MM	1
22	08140190008	8680858432721	EASY LOCK. TIN AP SPACER 8 MM	1
	08140190009	8680858432363	EASY LOCK. TIN AP SPACER 9 MM	1
	08140190010	8680858432370	EASY LOCK. TIN AP SPACER 10 MM	1
	08140190011	8680858432387	EASY LOCK. TIN AP SPACER 11 MM	1
	08140190012	8680858432394	EASY LOCK. TIN AP SPACER 12 MM	1
23	8050050011	8680858432349	500 MM S.S SURGICAL RULER	1
24	08301320460	8699931021769	LENGTH MEASURING DEVICE FOR NAIL (280-460 MM)	1
25	01610000070	8680858424337	STABILIZING ROD	1
	210200	8680858432943	EASY LOCK. TIN INSTRUMENT TRAY 2	1



	code	barcode	description	qty
26	81520002010	8698673428874	TIN COMPRESSION CAP SCREW	1
	81520000500	8699931028201	TIN CAP SCREW 5 MM	2
	81520001000	8698673428843	TIN CAP SCREW 10 MM	1
	81520001500	8698673428850	TIN CAP SCREW 15 MM	1
	81520002000	8698673428867	TIN CAP SCREW 20 MM	1
	0209001	8699931028409	TIBIA INTRAMEDULLARY NAIL CAP SCREW BOX	1
27	20620030050	8680858400300	NAIL LOCK. SCREW Ø5X30 MM	1
	20620035050	8680858400331	NAIL LOCK. SCREW Ø5X35 MM	3
	20620040050	8680858400362	NAIL LOCK. SCREW Ø5X40 MM	3
	20620045050	8680858400393	NAIL LOCK. SCREW Ø5X45 MM	3
	20620050050	8680858400423	NAIL LOCK. SCREW Ø5X50 MM	3
	20620055050	8680858400430	NAIL LOCK. SCREW Ø5X55 MM	3
	20620060050	8680858400447	NAIL LOCK. SCREW Ø5X60 MM	3
	20620065050	8680858400454	NAIL LOCK. SCREW Ø5X65 MM	3
	20620070050	8680858400461	NAIL LOCK. SCREW Ø5X70 MM	3
	20620075050	8680858400478	NAIL LOCK. SCREW Ø5X75 MM	3
	20620080050	8680858400485	NAIL LOCK. SCREW Ø5X80 MM	3
	85020000024	8680858406821	NAIL SCR.FOR LOCK. 4.5X25MM	3
	85020000030	8680858406852	NAIL SCR.FOR LOCK. 4.5X30MM	3
	85020000034	8680858406876	NAIL SCR.FOR LOCK. 4.5X35MM	3
	85020000040	8680858406906	NAIL SCR.FOR LOCK. 4.5X40MM	3
	85020000022	8680858406814	AP SCREW FOR NAILS 20 MM	3
	85020000026	8680858406838	AP SCREW FOR NAILS 25 MM	2
	85020000032	8680858406869	AP SCREW FOR NAILS 30 MM	2
	85020000036	8680858406883	AP SCREW FOR NAILS 35 MM	2
	0209000	8699931028515	TIBIA INTRAMEDULLAR NAIL SCREW BOX	2
20	01610000050	0600050420201	FACVLOCK TIN DDILL CLEEVE COMM	1
	01610000050	8680858430291	EASY LOCK TIN DRILL SLEEVE 5.0 MM	1 1
	01610000032 01610000065	8680858427475	EASY LOCK.TIN DRILL SLEEVE 3.5 MM	1
		8680858424320	STABILIZING DRILL SLEEVE TROCAR Ø9.0X135 MM	1
31	03610090135 01610000020	8680858424238 8680858424245		•
			EASY LOCK TIN DRIVE SLEEVE	1
	01610000025	8680858424252	EASY LOCK.TIN DRILL SLEEVE 4.2 MM	1
	02004000110	8699931024449	DEPTH GAUGE - TIN	1
	01610018005	8680858430314	TIN CANNULATED DRILL 5X180 MM	1
36	04551080310	8699931030815	K-WIRE TUBE Ø10XØ8X310 MM	1
	23412300030	8698673452817	KIRSCHNER WIRE TREADED POINT 3X300 MM	2
27	23410250120	8698673453128	KIRSCHNER WIRE TROCAR POINT 2X250 MM	3
37	01260030042	8680858405879	GRADUATED DRILL 4.2X300 MM (Pink)	1
38	22314030042	8680858429578	GRADUATED DRILL 4.2X300 MM (Yellow)	1
39	22313525035	8680858429554	GRADUATED DRILL 3.5X250 MM (Blue)	1
40	00204200250	8699931024500	GUIDE FOR K - WIRE 2X250MM (TIN)	1
	210300	8680858432950	EASY LOCK. TIN INSTRUMENT TRAY 3	1



	code	barcode	description	qty
41	01194000009	8699931028171	SLIDING HAMMER	1
42	01194010009	8680858431830	SLIDING HAMMER STOPPER	2
43	01610000055	8680858424306	NAIL IMPACTOR & EXTRACTOR ROD	1
44	08300000025	8699931021738	GUIDE WIRE PUSHER	1
45	02010101002	8698673493308	SOFT SCREW DRIVER QUICK LARGE	1
46	02020818035	8680858427468	SCREW DRIVER QUICK TIP Ø3.5X8X180 MM	2
47	01193002009	8699931028126	BONE HAMMER - MEDIUM	1
	210400	8680858432967	EASY LOCK. TIN INSTRUMENT TRAY 4	1
	00560270170	8699931010787	CONTAINER 560X270X170 MM	1
	00560270200	8699931024746	CONTAINER 560X270X200 MM	1
	23410090025	8699931018110	KIRSCHNER WIRE BALL TIP 2.5X900 MM	1



# Sample Cases

preop postop





