



Surgical Technique

3.5mm Calcaneal Plate

about us

Auxein Medical is an integrated, research based, orthopaedic Implants & instruments manufacturing company, producing a wide range of quality, affordable generic implants, trusted by healthcare professionals and patients across geographies. It is the Company's constant endeavor to provide a wide basket of generic and our innovator products that exceed the highest expectations of customers in term of quality and safety. The company has world-class manufacturing unit established in india and serves customers in over 75 countries worldwide.

Our Achievements



Guidelines

This publication sets forth detailed recommended procedures for using Auxein Medical devices and instruments.

It offers guidance that needs to be heeded. However, with any such technical guide, each surgeon must consider the unique needs of each patient and make appropriate adjustments when and as required.

A workshop training under DAIS Academy by Auxein will provide assistance prior to first surgery. It is vital to know that all non-sterile devices must be cleaned and sterilized before use.

Moreover, multi-component instruments must be disassembled for cleaning. The surgeon must discuss all relevant risks, including the finite lifetime of the device, with the patient, when necessary.

Please NOTE that all the bone screws referenced in this document here are not approved for screw attachment or fixation in the areas not mentioned in this publication.

Warning:

This description is not sufficient for immediate application of the instrumentation. Instruction by a surgeon experienced in handling this instrumentation is highly recommended.

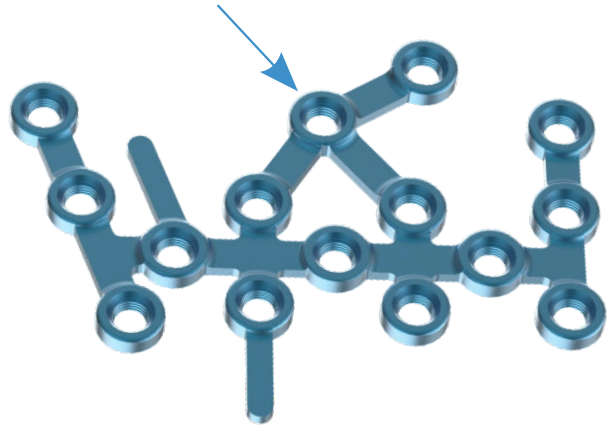


The Locking Calcaneal Plate

Overview

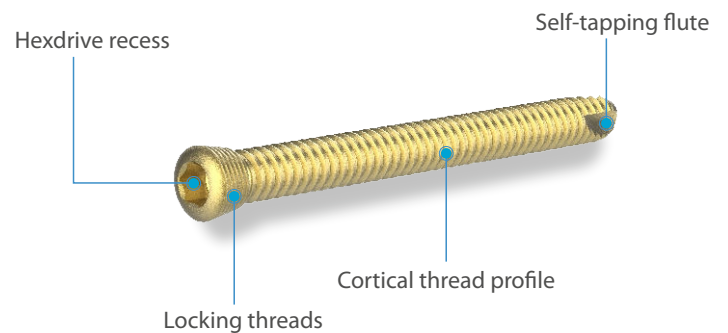
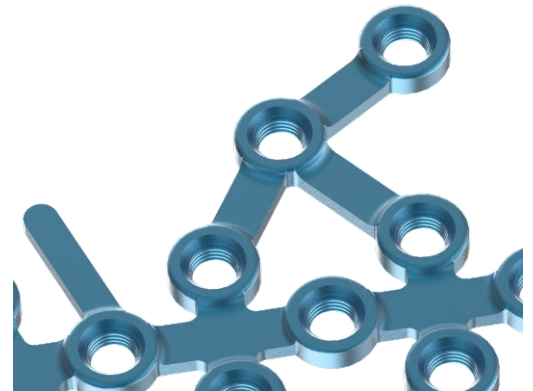
Plate features

- Available in left and right versions
- 15 locking holes available
- Bendable tabs
- Locking holes throughout the plate (indicated by arrows) for the screws buttressing the articular surface
- Lateral application



Threaded locking holes

- Provides a fixed-angle construct to buttress surfaces
- Permits multiple points of fixation
- Are compatible with 3.5 mm locking screws



The AO Principles of Fracture Management

Mission

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

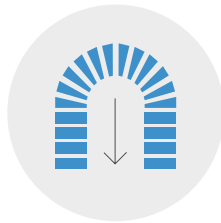
AO Principles^{1,2}

1.



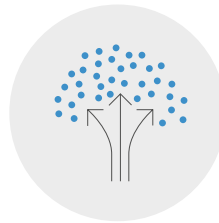
Fracture reduction and fixation to restore anatomical relationships.

2.



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

3.



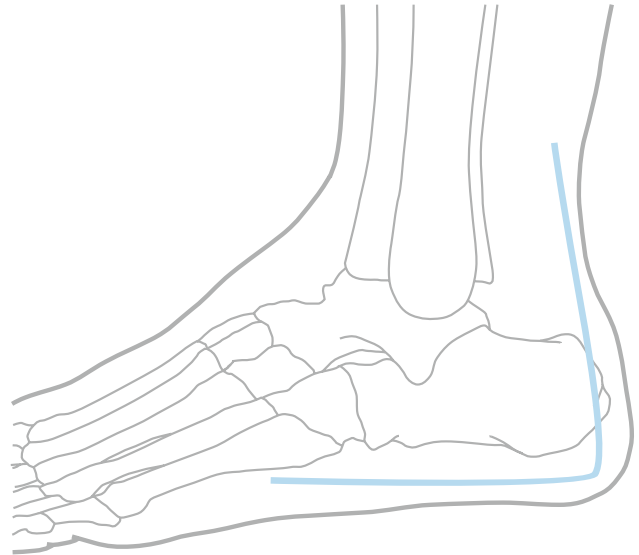
Preservation of the blood supply to soft-tissues and bone by gentle reduction techniques and careful handling.

4.



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

Place the patient in lateral decubitus position. Make an extensile, right-angled lateral incision. The vertical portion of the incision should be just anterior to the heel cord and extend down to the plantar and lateral skin junction. Continue the incision forward, horizontally, exposing the calcaneocuboid joint. The incision is carried straight down to bone at its angle and then developed to allow a single, thick flap to be lifted from the periosteal surface. This approach allows raising a single flap consisting of skin and soft tissue which includes the peroneal tendons, sural nerve and the detached calcaneofibular ligament.

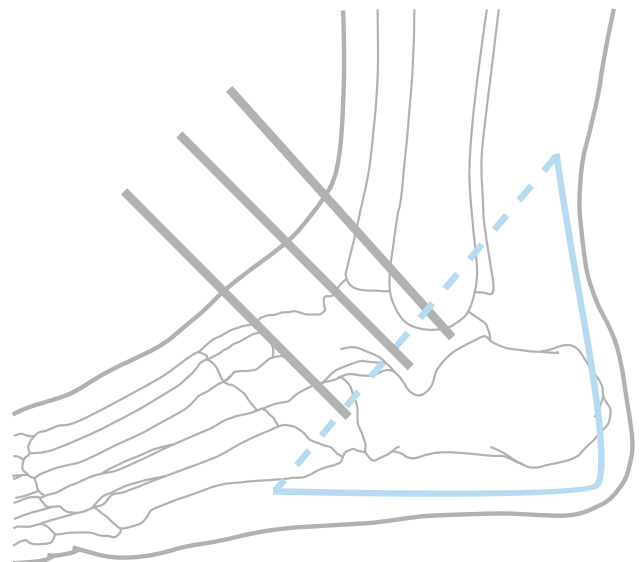


A "no-touch" technique may be employed by retracting the flap with Kirschner wires in the talus and in the cuboid, or with an oral surgery tongue retractor.

WARNING: Care should be taken to avoid the sural nerve when dissecting.

Precautions:

- Instruments and screws may have sharp edges or moving joints that may pinch or tear user's glove or skin.
- Handle devices with care and dispose worn bone cutting instruments in an approved sharps container.
- Care must be taken to avoid prolonged traction of the flap, especially if Kirschner wires are used.



Reduction

1. Reduce the fracture

Instruments:

GW-1.2-230 Guide Wire with Threaded Trocar Tip,
Ø1.2mm x Thread Length 10mm x Length 230mm

3402-000 T-Handle with Quick Coupling for Small Fragment

Reduce fracture fragments. If Kirschner wires are used to temporarily reduce the fracture, they must be placed to avoid interference with final plate placement. To accomplish this, lay a plate or bending template on the calcaneus.

Notes:

- Guide wire with T-Handle, for the 3.5mm Calcaneal Plate s, can be used to aid in the reduction of fracture fragments.
- The proximal tab should be placed in front of the crucial angle of Gissane to push down the anterior process fragment.

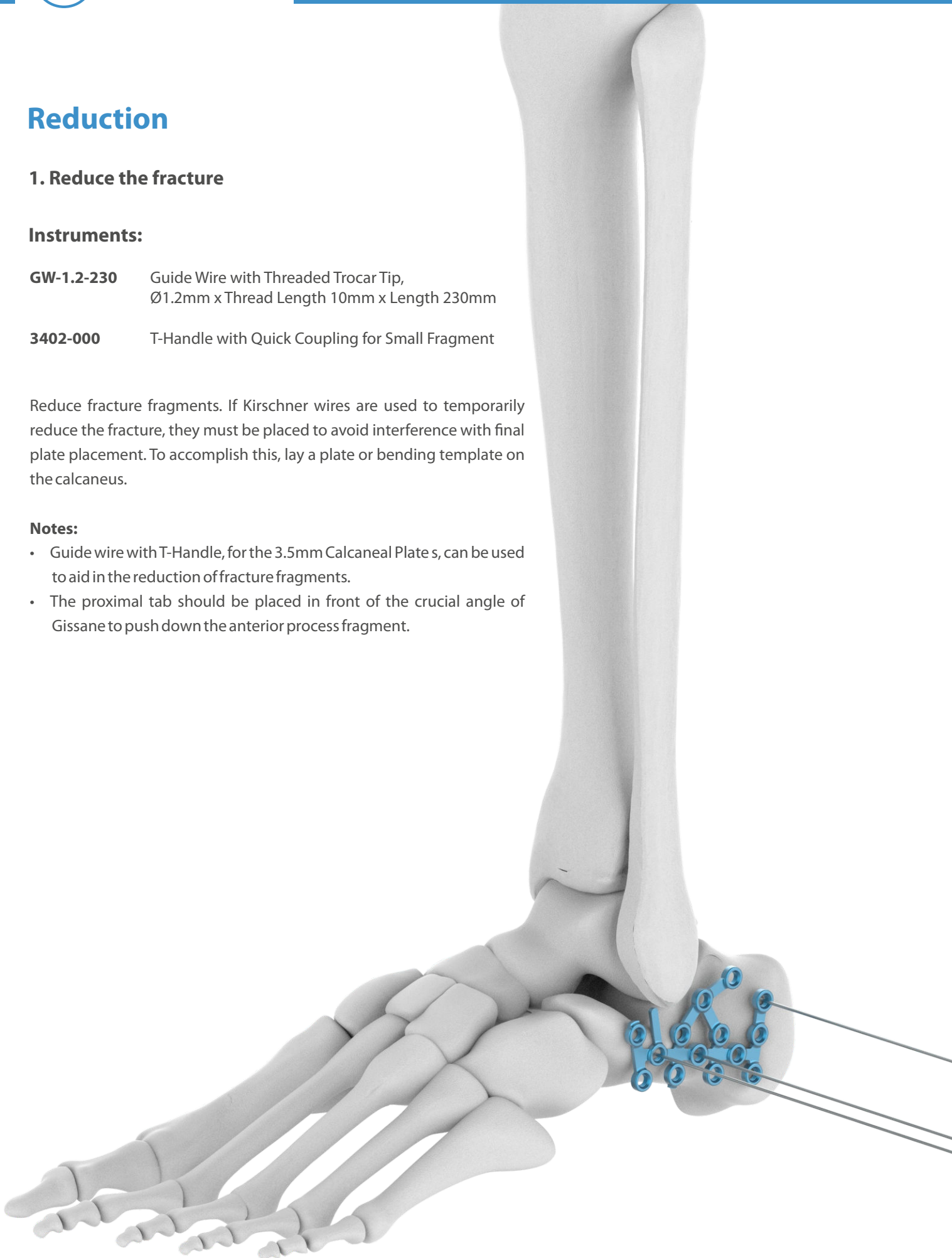


Plate Countering

Instruments:

3441-18	Threaded Drill Sleeve, for Drill Bit Ø2.8mm - Small Fragment
3409-01L	Bending Iron, Left
3409-01R	Bending Iron, Right

Using the appropriate bending template as a guide, contour the plate using the universal bending pliers until an acceptable fit is achieved.

Note: With a well-reduced calcaneus, it should not be necessary to contour the longitudinal axis of the plate.

If necessary, fine bending may be achieved in situ with two bending pins for LCP plates. Thread one holder into a hole and thread a second holder into an adjacent hole. Apply small incremental force to achieve the required bending.

Precaution: Care should be taken to avoid overbending because the holders may become dislodged from the plate hole and damage the plate threads.



Secure Plate to Bone

Instruments:

- | | |
|---------------------|---|
| 2100-2.5-112 | Drill Bit with Quick Coupling End, Ø2.5mm x Length 112mm, for Small Fragment (For 3.5 mm Locking Screw) |
| 2104-02 | Bone Tap Quick Coupling for Cortical Screws, Ø3.5mm, for Small Fragment. (For 3.5 mm Locking Screw) |
| 1472-046 | Self-Centering Double Drill Guide, Ø2.5/3.5mm, for Small Fragment (3.5 mm Locking Screw) |
| TQ-2.0 | Torque Limiting Attachment, 0.8Nm, for Small Fragment |
| 1472-064 | Torque Screwdriver Handle |

4. Secure plate to bone

Use the 3.5 mm Locking Screws will be used for fixation.

Precautions:

Avoid excessive re-drilling, especially in poor bone quality.

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



Drilling

Instruments:

3441-18 Threaded Drill Sleeve,
for Drill Bit Ø2.8mm - Small Fragment

A. To secure the plate with 3.5 mm Locking screw, insert the 2.5 mm end of the 3.5 mm universal drill guide into a plate hole and drill through both cortices with a 2.5 mm drill bit.

Measure for screw length using the depth gauge.

Select and insert an appropriate length 3.5 mm self-tapping locking screw using the hex screwdriver.

Note:

To lag a 3.5 mm Cortical screw through a plate hole, use a 3.5 mm drill bit to overdrill the near Cortical. Insert the 3.5 mm end of the 3.5 mm universal drill guide into the plate hole and drill through the near Cortical with a 3.5 mm drill bit.

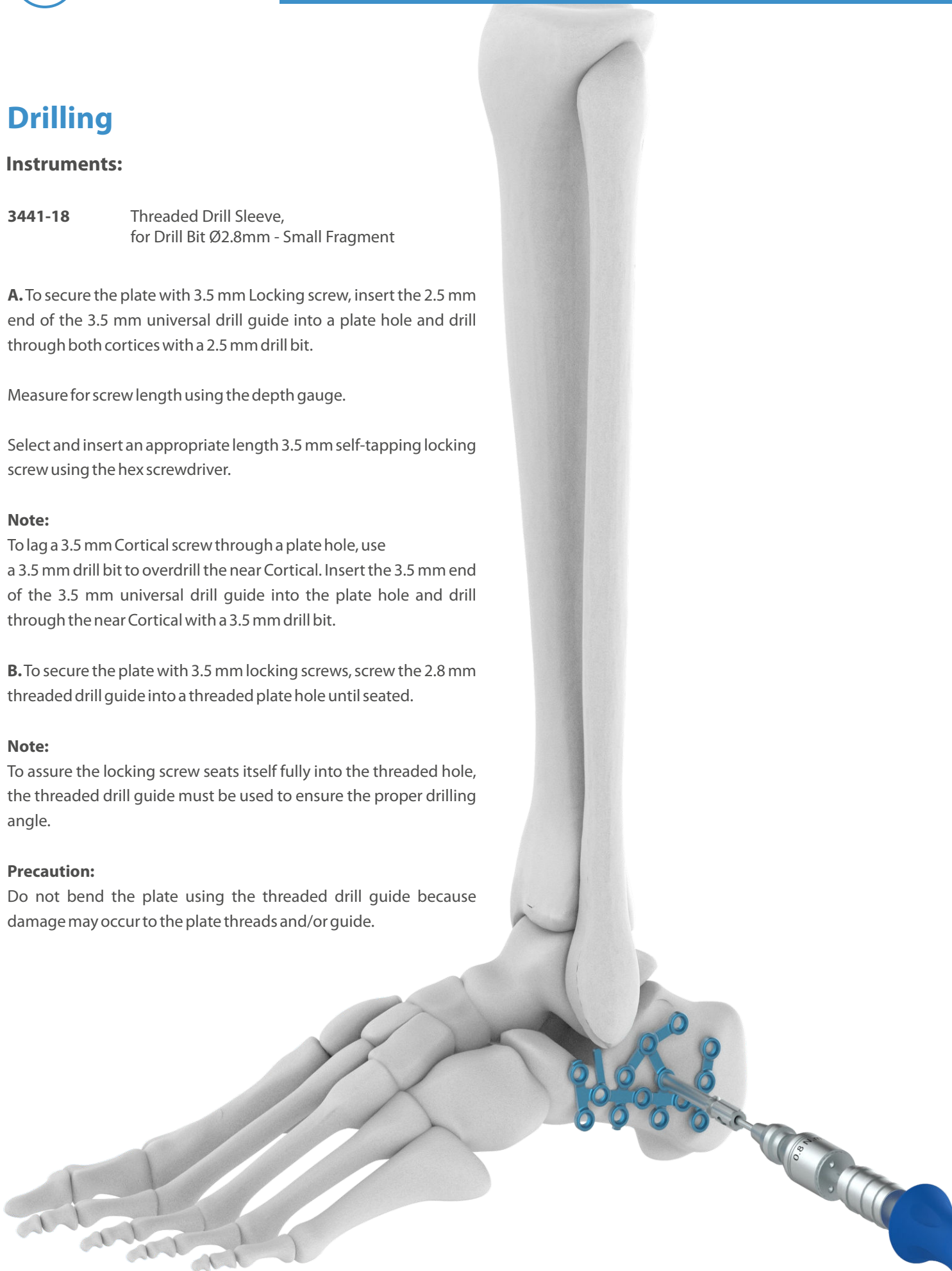
B. To secure the plate with 3.5 mm locking screws, screw the 2.8 mm threaded drill guide into a threaded plate hole until seated.

Note:

To assure the locking screw seats itself fully into the threaded hole, the threaded drill guide must be used to ensure the proper drilling angle.

Precaution:

Do not bend the plate using the threaded drill guide because damage may occur to the plate threads and/or guide.



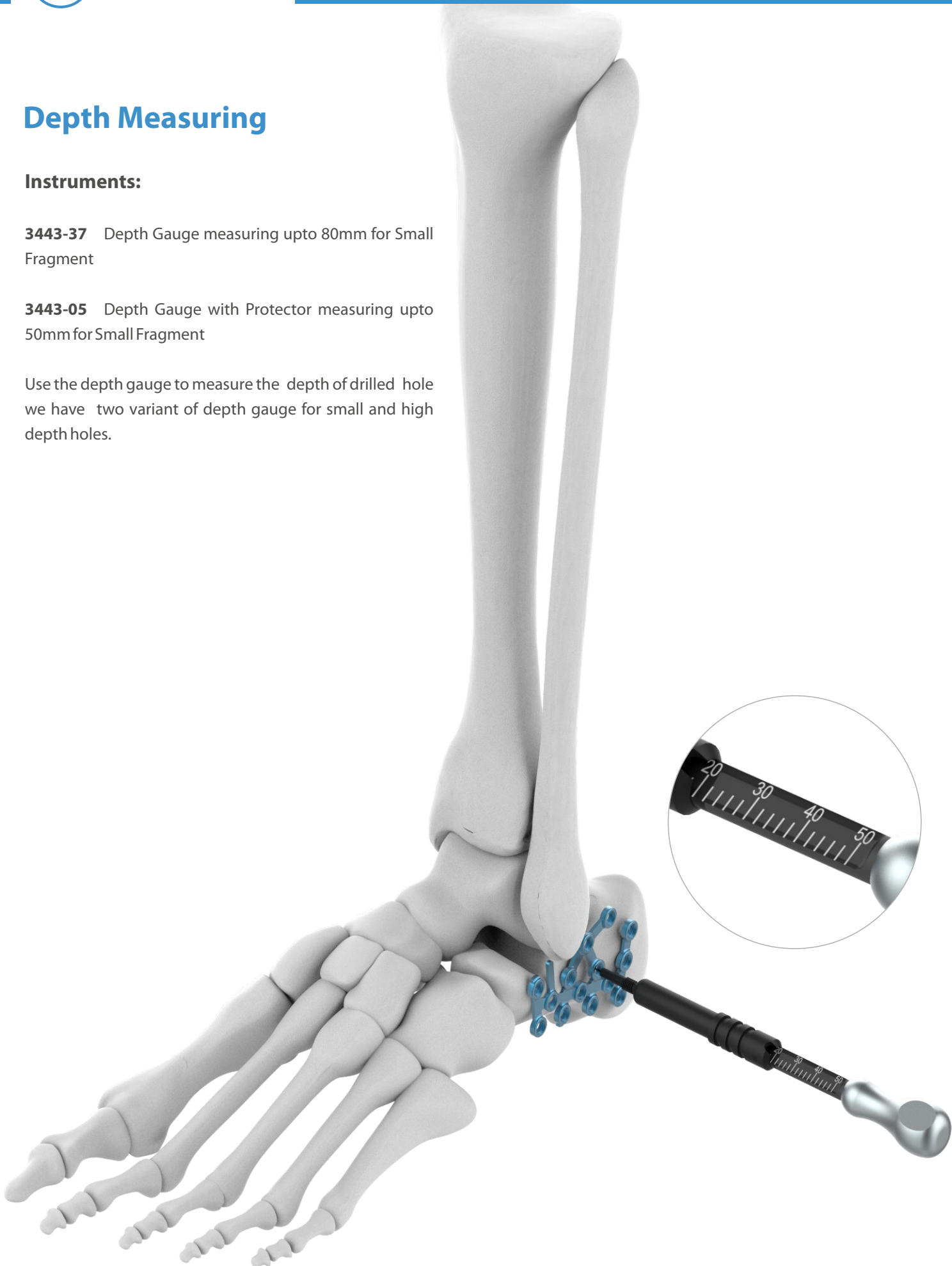
Depth Measuring

Instruments:

3443-37 Depth Gauge measuring upto 80mm for Small Fragment

3443-05 Depth Gauge with Protector measuring upto 50mm for Small Fragment

Use the depth gauge to measure the depth of drilled hole we have two variant of depth gauge for small and high depth holes.



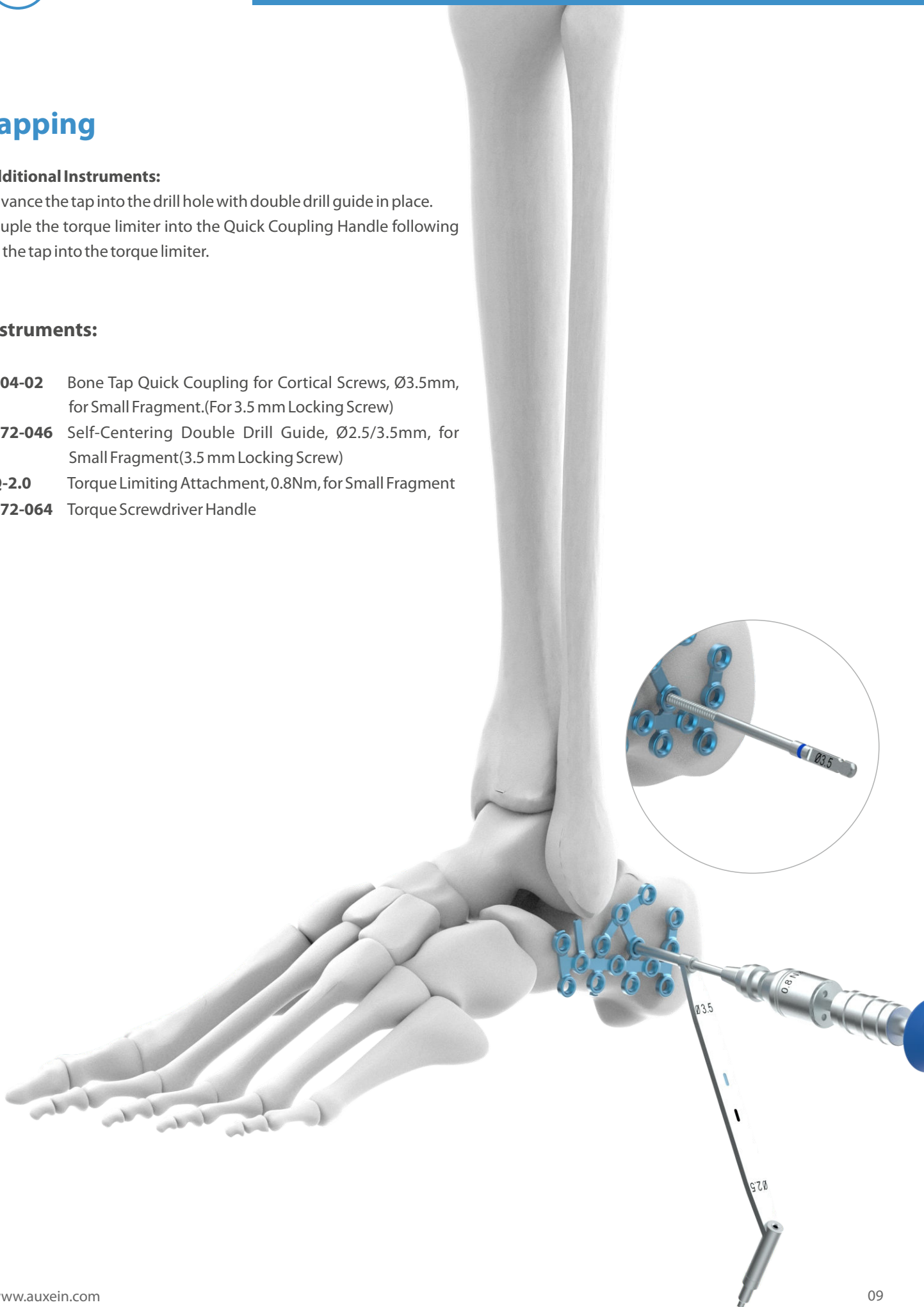
Tapping

Additional Instruments:

Advance the tap into the drill hole with double drill guide in place.
Couple the torque limiter into the Quick Coupling Handle following up the tap into the torque limiter.

Instruments:

- 2104-02** Bone Tap Quick Coupling for Cortical Screws, Ø3.5mm, for Small Fragment.(For 3.5 mm Locking Screw)
- 1472-046** Self-Centering Double Drill Guide, Ø2.5/3.5mm, for Small Fragment(3.5 mm Locking Screw)
- TQ-2.0** Torque Limiting Attachment, 0.8Nm, for Small Fragment
- 1472-064** Torque Screwdriver Handle



Securing The Locking Screw

Additional Instruments:

3445-2.5 T-Handle Screwdriver, Hex 2.5mm, Self-Retaining for Small Fragment.

3406-03 Hexagonal Screwdriver - 2.5mm Tip, for Small Fragment

TQ-2.0 Torque Limiting Attachment, 0.8Nm, for Small Fragment

1472-064 Torque Screwdriver Handle

Using the 2.8 mm drill bit through the threaded drill guide, drill through both cortices.

Remove the drill guide.

Measure for screw length using the depth gauge.

Note:

3.5 mm locking screws, with hex recess, are included in the locking calcaneal plate and screw instrument and implant set however, 3.5 mm locking screws with small hexagonal recess may also be used.

Insert the appropriate length 3.5 mm self-tapping locking screw under power using a torque limiting attachment (TLA) and hexagonal screwdriver shaft, as appropriate.

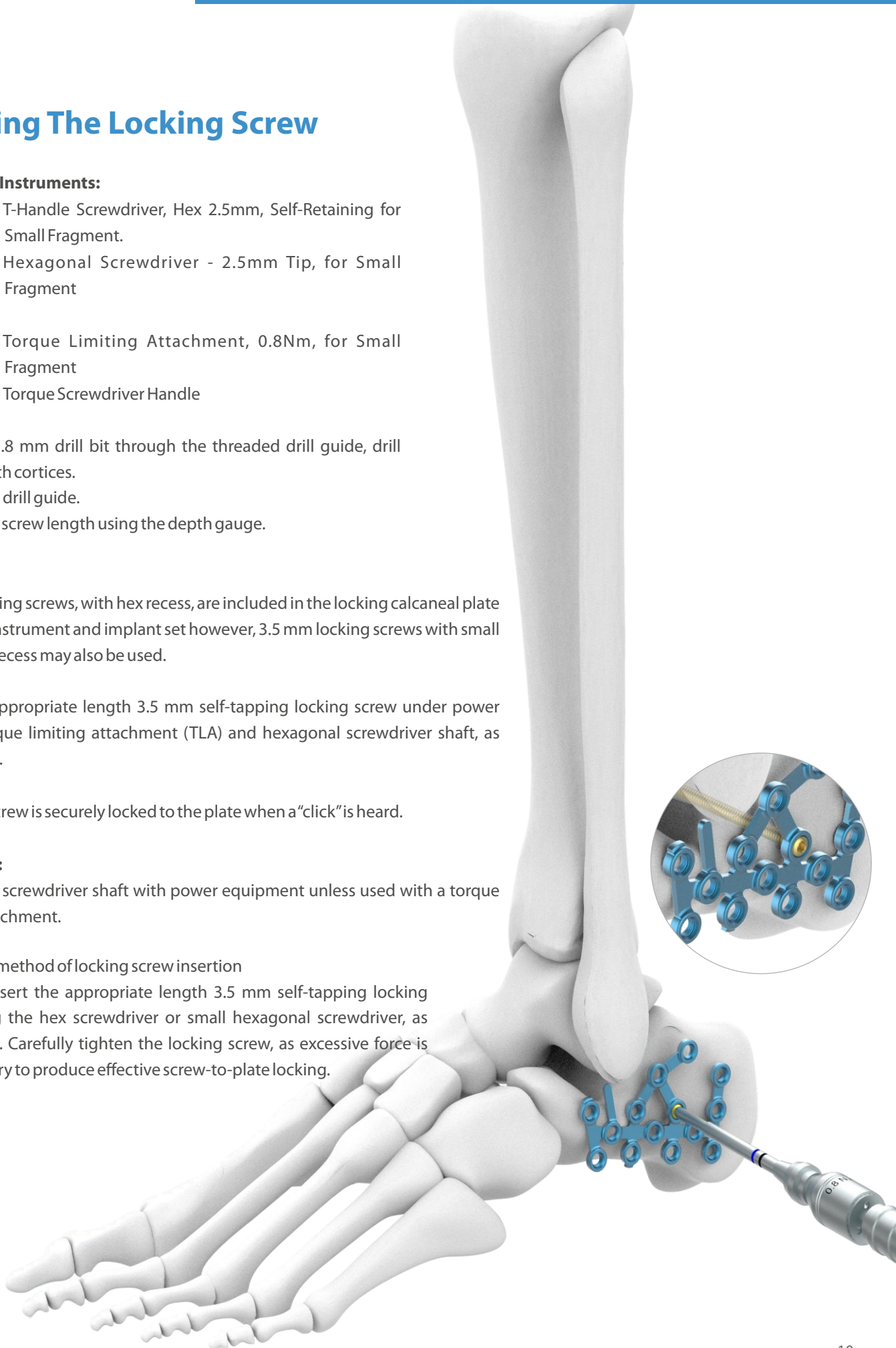
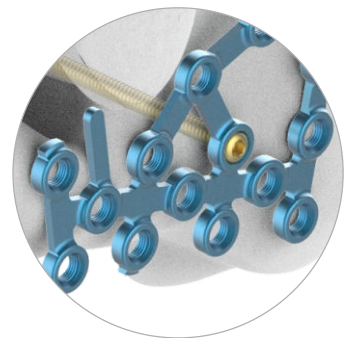
Note: The screw is securely locked to the plate when a “click” is heard.

Precaution:

Never use a screwdriver shaft with power equipment unless used with a torque limiting attachment.

Alternative method of locking screw insertion

Manually insert the appropriate length 3.5 mm self-tapping locking screw using the hex screwdriver or small hexagonal screwdriver, as appropriate. Carefully tighten the locking screw, as excessive force is not necessary to produce effective screw-to-plate locking.



5. Closure

Close the wound in a routine fashion.

Ensure proper reconstruction, screw placement and screw length under image intensification. Verify that the screws are not in the joint or in the soft tissue.

Implant Removal

In case the physician decides to remove the implants, implants can be removed by using general surgical instruments. To remove locking screws, unlock all screws from the plate, then remove the screws completely from the bone. This prevents simultaneous rotation of the plate when unlocking the last locking screw. In case of difficult removal circumstances, a "Screw Extraction Set" Handling Technique is available with corresponding instructions.

Precaution:

Do not use torque limiter for screw removal.



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

3443-37

Depth Gauge measuring upto 80mm for Small Fragment



3445-2.5

T-Handle Screwdriver, Hex 2.5mm, Self-Retaining for Small Fragment



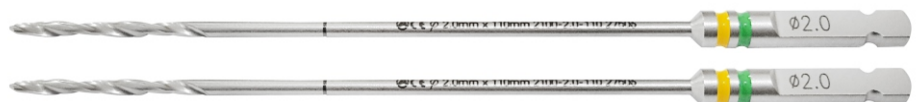
3992-035

Allen Key, Hex 3.0mm, for Small Fragment



2100-2.0-110

Drill Bit with Quick Coupling End, Ø2.0mm x Length 110mm, for Small Fragment



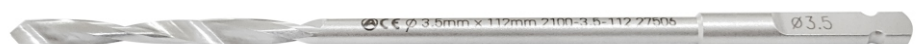
2100-2.5-112

Drill Bit with Quick Coupling End, Ø2.5mm x Length 112mm, for Small Fragment



2100-3.5-112

Drill Bit with Quick Coupling End, Ø3.5mm x Length 112mm, for Small Fragment



2103-2.8-165

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



2104-27

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



2104-02

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



2104-04

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



3400-01

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



3408-01

Hexagonal Screwdriver Shaft - 2.5mm Tip, Quick Coupling, for Small Fragment



Instrument

3408-03 Hexagonal Screwdriver Shaft - 2.0mm Tip, Quick Coupling, for Small Fragment



2186-2.5 HSS Drill Bit, Ø2.5mm , for Small Fragment



2106-1.2 Guide Sleeve for Ø1.2mm K. Wires, for Small Fragment



3443-05 Depth Gauge with Protector measuring upto 50mm for Small Fragment



3443-39 Trephine for Small Fragment



BT-SF-06 Bending Template, Small, for Small Fragment



BT-SF-08 Bending Template, Medium, for Small Fragment



BT-SF-10 Bending Template, Large, for Small Fragment



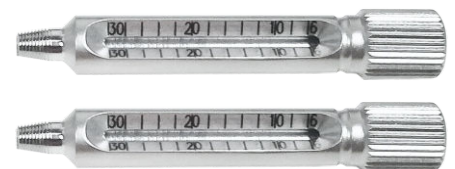
3402-000 T-Handle with Quick Coupling for Small Fragment



1472-054 Quick Coupling Shaft



TDG-2.7 Threaded Drill Sleeve for Drill Bit Ø2.0mm - Small Fragment



3441-18 Threaded Drill Sleeve, for Drill Bit Ø2.8mm - Small Fragment



Instrument

3420-01 Drill Sleeve Insert Ø3.5/2.5mm for Small Fragment



1472-036 Drill Guide 2.0mm for Small Fragment



1472-044 Double Drill Guide Ø2.0/2.7mm for Small



1472-046 Self-Centering Double Drill Guide, Ø2.5/3.5mm, for Small Fragment



3441-16 Drill Guide for Neutral and Loaded Positic



1472-066 Hohmann Retractor, 6.5mm, for Small Fragment



Instrument

1472-068 Hohmann Retractor, 8.5mm, for Small Fragment



2146-018 Hohmann Retractor, 15.5mm, for Small Fragment



2149-1012 Periosteal Elevator, Straight, 12mm, for Small Fragment



3406-02 Hexagonal Screwdriver - 2.0mm Tip for Small Fragment



3406-02S Screw Holding Sleeve for 2.0mm Tip Screwdriver, for Small Fragment



3406-03 Hexagonal Screwdriver - 2.5mm Tip, for Small Fragment



Instrument

3406-03S

Screw Holding Sleeve for 2.5mm Tip Screwdriver, for Small Fragment



3409-01L

Bending Iron, Left



3409-01R

Bending Iron, Right



2107-1180

Reduction Forcep, Pointed, Ratchet Lock, 180mm, for Small Fragment



2106-1160

Reduction Forcep, Serrated Jaws, Speed Lock, 160mm, for Small Fragment



2106-190

Self-Centering Bone Holding Forcep, Speed Lock, 190mm, for Small Fragment



Instrument

2150-1006

Periosteal Elevator with Silicon Handle, Curved, 6mm, for Small Fragment



TQ-2.0

Torque Limiting Attachment, 0.8Nm, for Small Fragment



TQ-2.5

Torque Limiting Attachment, 1.5Nm, for Small Fragment



1472-064

Torque Screwdriver 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



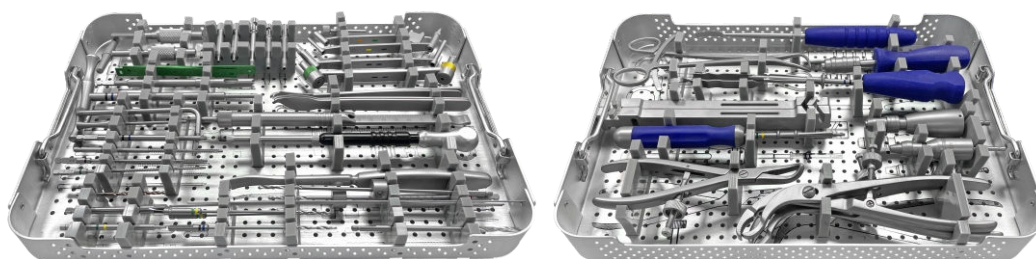
ST-007NW

Screw Caddy for 3.5mm Wise-Lock Small Fragment System



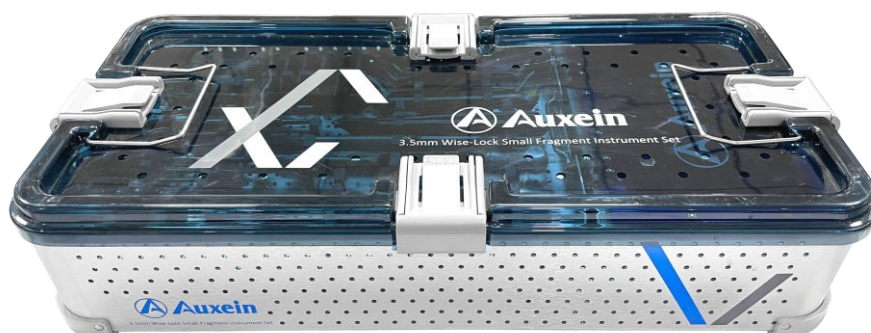
7-050-03

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

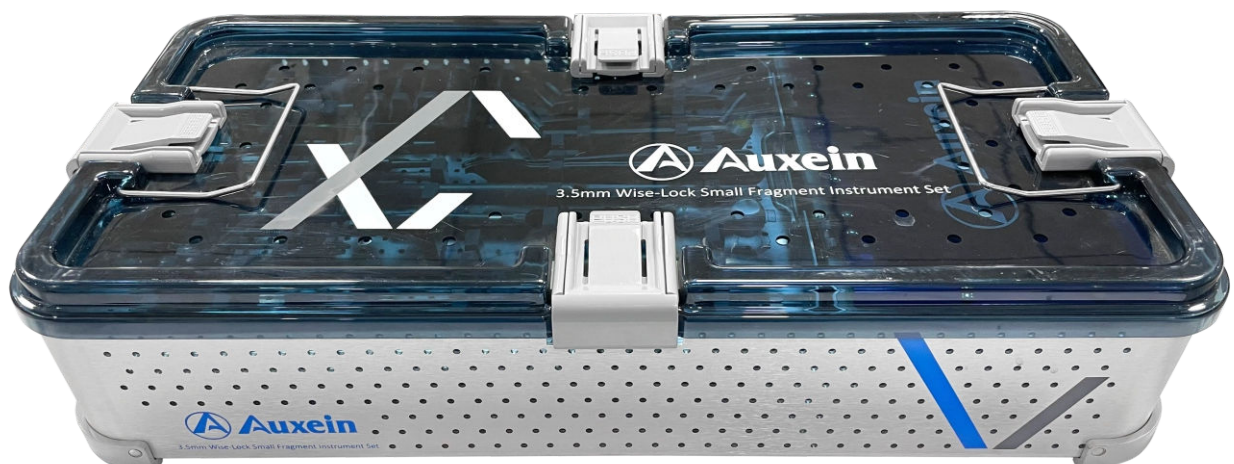
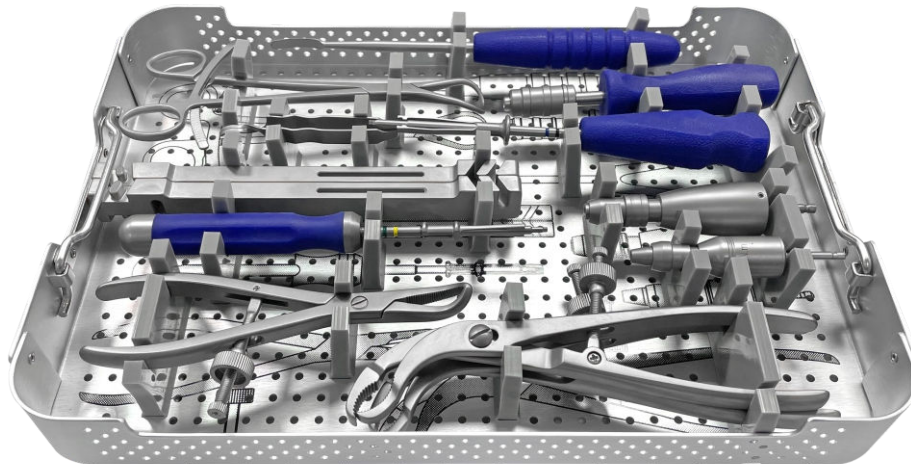
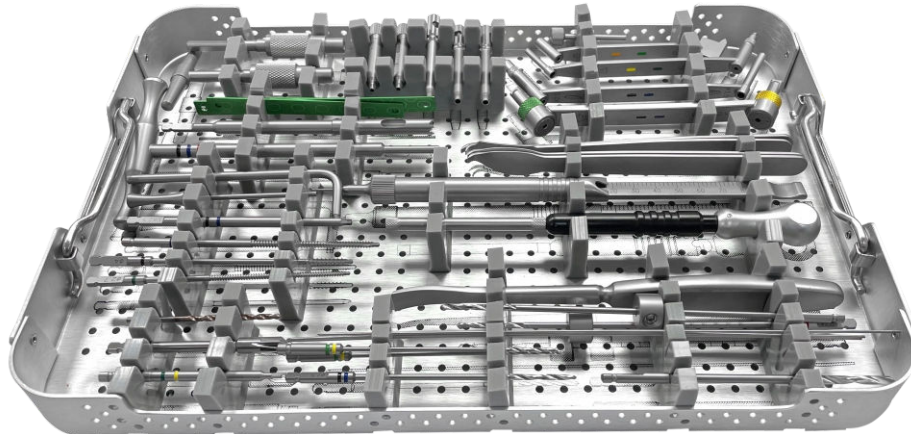


IC-2310-WL

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 upto 80mm for Small Fragment	1
3445-2.5	T-Handle Screwdriver, Hex 2.5mm, Self-Retaining for Small Fragment	1
3992-035	Allen Key, Hex 3.0mm, for Small Fragment	1
2100-2.0-110	Drill Bit with Quick Coupling End, Ø2.0mm x Length 110mm, for Small Fragment	2
2100-2.5-112	Drill Bit with Quick Coupling End, Ø2.5mm x Length 112mm, for Small Fragment	1
2100-3.5-112	Drill Bit with Quick Coupling End, Ø3.5mm x Length 112mm, for Small Fragment	1
2103-2.8-165	Drill Bit Quick Coupling with Stopper, Ø2.8mm x Length 165mm, for Small Fragment	2
2104-27	Bone Tap Quick Coupling for Wise-Lock Screws, Ø2.7mm, for Small Fragment	1
2104-02	Bone Tap Quick Coupling for Cortical Screws, Ø3.5mm, for Small Fragment	1
2104-04	Bone Tap, Quick Coupling for Cancellous Screws, Ø4.0mm, for Small Fragment	1
3400-01	Countersink for Ø3.5/4.0mm Screws, Quick Coupling, for Small Fragment	1
3408-01	Hexagonal Screwdriver Shaft - 2.5mm Tip, Quick Coupling, for Small Fragment	1
3408-03	Hexagonal Screwdriver Shaft - 2.0mm Tip, Quick Coupling, for Small Fragment	1
2186-2.5	HSS Drill Bit, Ø2.5mm , for Small Fragment	1
2106-1.2	Guide Sleeve for Ø1.2mm K. Wires, , for Small Fragment	1
3443-05	Depth Gauge with Protector measuring upto 50mm for Small Fragment	1
3443-39	Trephine for Small Fragment	1
BT-SF-06	Bending Template, Small, for Small Fragment	1
BT-SF-08	Bending Template, Medium, for Small Fragment	1
BT-SF-10	Bending Template, Large, for Small Fragment	1
3402-000	T-Handle with Quick Coupling for Small Fragment	1
1472-054	Quick Coupling Shaft	1
TDG-2.7	Threaded Drill Sleeve for Drill Bit Ø2.0mm - Small Fragment	2
3441-18	Threaded Drill Sleeve, for Drill Bit Ø2.8mm - Small Fragment	3
3420-01	Drill Sleeve Insert Ø3.5/2.5mm for Small Fragment	1
1472-036	Drill Guide 2.0mm for Small Fragment	1
1472-044	Double Drill Guide Ø2.0/2.7mm for Small Fragment	1
1472-046	Self-Centering Double Drill Guide, Ø2.5/3.5mm, for Small Fragment	1
3441-16	Drill Guide for Neutral and Loaded Position Ø3.5mm, for Small Fragment	1
1472-066	Hohmann Retractor, 6.5mm, for Small Fragment	1
1472-068	Hohmann Retractor, 8.5mm, for Small Fragment	1
2146-018	Hohmann Retractor, 15.5mm, for Small Fragment	2
2149-1012	Periosteal Elevator, Straight, 12mm, for Small Fragment	1
3406-02	Hexagonal Screwdriver - 2.0mm Tip for Small Fragment	1
3406-02S	Screw Holding Sleeve for 2.0mm Tip Screwdriver, for Small Fragment	1
3406-03	Hexagonal Screwdriver - 2.5mm Tip, for Small Fragment	1
3406-03S	Screw Holding Sleeve for 2.5mm Tip Screwdriver, for Small Fragment	1
3409-01L	Bending Iron, Left	1
3409-01R	Bending Iron, Right	1
2107-1180	Reduction Forcep, Pointed, Ratchet Lock, 180mm, for Small Fragment	1
2106-1160	Reduction Forcep, Serrated Jaws, Speed Lock, 160mm, for Small Fragment	1

Instrument

Codes	Set Consisting of:	Units
2106-190	Self-Centering Bone Holding Forcep, Speed Lock, 190mm, for Small Fragment	2
2150-1006	Periosteal Elevator with Silicon Handle, Curved, 6mm, for Small Fragment	1
TQ-2.0	Torque Limiting Attachment, 0.8Nm, for Small Fragment	1
TQ-2.5	Torque Limiting Attachment, 1.5Nm, for Small Fragment	1
1472-064	Torque Screwdriver 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 Holding Forcep	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



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