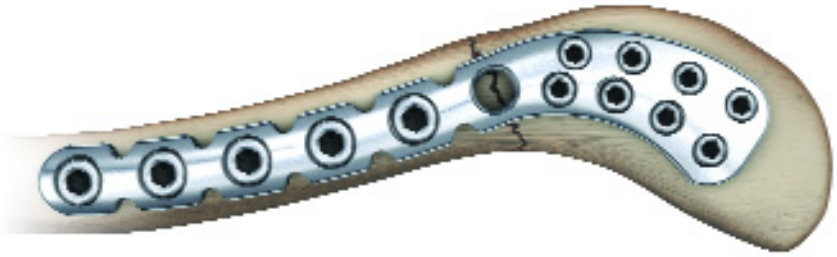
Surgical Technique
International Version

smith&nephew
PERI-LOC◇
Upper Extremity
Locked Plating System

Clavicle Locking Plate



PERI-LOC◇ Upper Extremity Locked Plating System

Clavicle Surgical Technique

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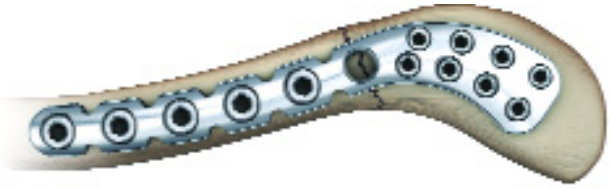
Nota Bene
The technique description herein is made available to the healthcare professional to illustrate the author's suggested treatment for the uncomplicated procedure. In the final analysis, the preferred treatment is that which addresses the needs of the specific patient.

Introduction

PERI-LOC◇ Locked Plating System Overview

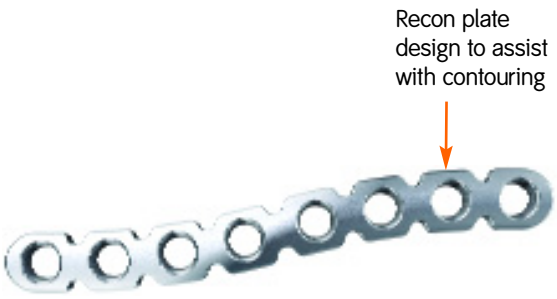


The PERI-LOC Locked Plating System combines the advantages of locked plating with the flexibility and benefits of traditional plates and screws. Utilising both locking and non-locking screws, the PERI-LOC system allows for the creation of a construct that resists angular collapse and also functions as an effective fracture reduction aid. A simple, intuitive instrument set featuring standardised drill bits, screwdrivers, and colour coded drill guides helps make the PERI-LOC system efficient and easy to use.

The precise screw trajectories, anatomic contour, and locking capabilities of the PERI-LOC Clavicle Plates provide a stable construct for predictable reconstruction of complex fractures of the clavicle.

PERI-LOC◇ Clavicle Locking Plates

Superior Distal



Superior Medial

Inferior Medial

Inferior Distal

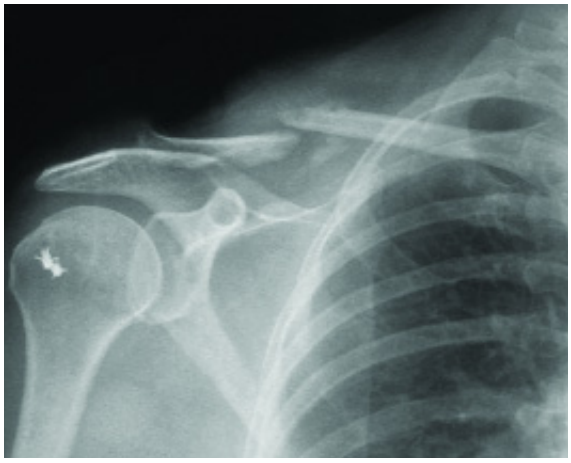
Features

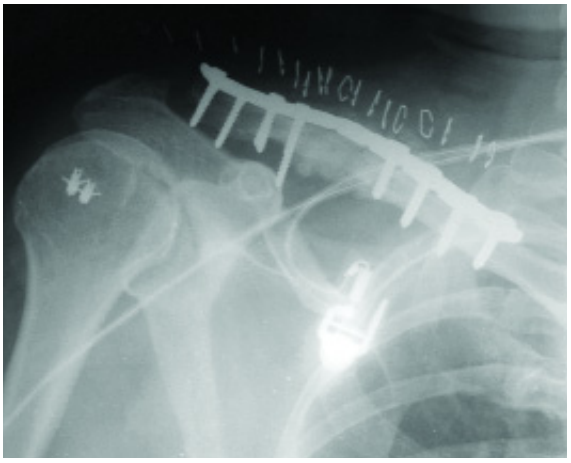
- Four (4) plate options: Superior Medial, Superior Distal, Inferior Medial and Inferior Distal
- Superior plates available in left and right for precise contour
- Pre-contoured to reduce need for additional intraoperative contouring
- Recon plate segments aid additional contouring if necessary
- Low profile plate and screws reduce the potential for soft tissue and tendon irritation
- Different plate lengths to accommodate a variety of fractures
- 316L stainless steel for strength
- Bevelled plate tip for percutaneous insertion
- Locking and non-locking option in every hole for custom screw configurations
- Convergent trajectory of the Superior Distal plate's four most lateral screws increases pull out strength when subjected to downward forces

Indications

The PERI-LOC° Clavicle Plates are indicated for fixation of fractures, non-unions and osteotomies of the clavicle.

Clavicle Case Example





Surgical Technique

Patient Positioning

The patient may be placed in either the beach chair or supine position. A bolster may be placed in the midline to help facilitate fracture reduction. The patient's head should be turned away from the operative side, shoulder girdle and clavicular region of the upper chest prepped and draped in standard fashion. A radiolucent table is preferable so as not to impede fluoroscopy.

Incision

The incision is made parallel to Langer's lines along the inferior boarder of the clavicle centred over the fracture site. Dissection is carried to the bone either superiorly for superior plating or inferiorly for anterior/inferior plating. Care should be taken to preserve soft tissue attachments to fracture fragments, especially butterfly fragments.

Fracture Reduction and Provisional Fixation

After exposure and debridement of the fracture site, the fracture is reduced and provisionally fixed under fluoroscopy with K-wires, reduction forceps or suture fixation. With care to avoid periosteal stripping, particular care must be taken to retain proper clavicular length. Reduction aids should be placed so as not to interfere with placement of the plate. The PERI-LOC° Clavicle Plates may also be used as reduction tools due to their anatomical contour and locking/non-locking screw options.

Plate Selection

The appropriate plate is selected following fracture reduction. In keeping with the surgical approach (superior or inferior) the corresponding medial or distal plate will be chosen to best address the fracture pattern. The optimal plate selection should provide at least four screw holes on either side of the fracture for maximum fixation.

Superior Medial

Superior Distal

Inferior Medial

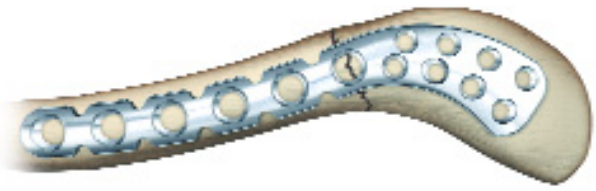
Inferior Distal

Superior and Inferior Plating

The PERI-LOC® Superior and Anterior/Inferior Clavicle Plates are anatomically pre-contoured with left and right plates. Each plate type has three specific size variations to address different fracture patterns: lateral, mid-diaphyseal, or medial. The diaphyseal portions accept 3.5mm screws (locking and non-locking). The Superior Distal Plate accepts up to eight (8) 2.7mm screws (locking or non-locking) in the lateral segment. The Inferior Distal Plate has seven (7) different 2.7mm screw (locking or non-locking) locking options for maximum fixation.

Plate Positioning

Plate position on the clavicle will be dictated by fracture pattern and/or patient anatomy. Optimal position centres the plate over the fracture. Utilise 2.7mm Provisional Fixation (PF) Pins and Reduction Forceps to reduce the fracture and provisionally stabilise the constraint.

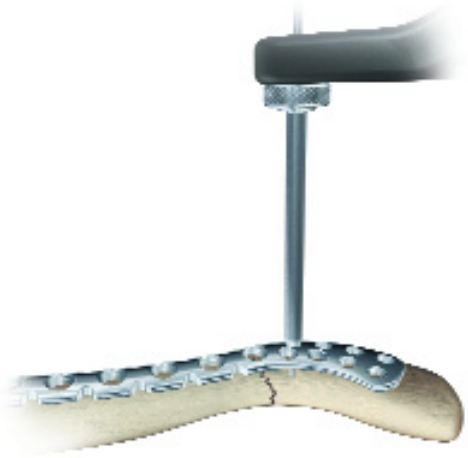


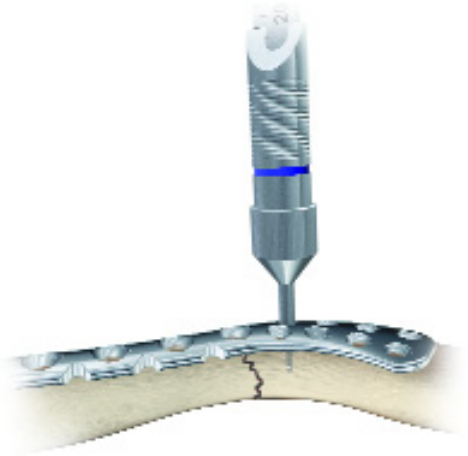
Screw Insertion Tips:

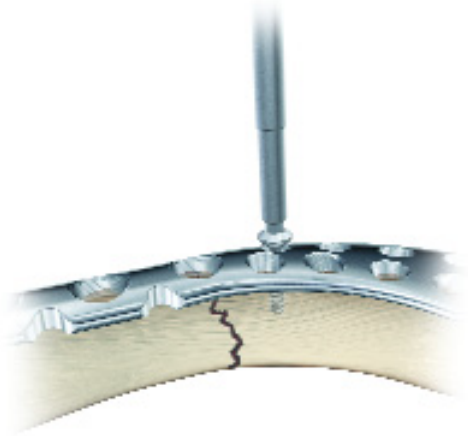
- Care must be taken to not over penetrate the far cortex of the clavicle during reduction and screw insertion in order to avoid injury to neurovascular structures deep into the clavicular area.
- If non-locking screws are to be used in a plate to gain compression, it is preferable that they be inserted prior to any locking screws.
- If either the 3.5mm Locking Screw Guide with 2.7mm Locking Drill Guide Insert or 2.7mm Locking Screw Guide with 2.0mm Locking Drill Guide Insert are used, remove the Drill Guide Insert before inserting the appropriate length screw through the slotted Outer Sleeve. *Note that the entire Drill Guide assembly must be removed before inserting a screw less than 24mm in length.* Advance the screw with the appropriate Hexdriver until the black laser etched marks are at the top of the Outer Sleeve then remove the Outer Sleeve and tighten by hand.
- For a pre-determined screw trajectory when inserting Cortex Screws, either the 3.5mm Locking Drill Guide with 2.7mm Insert or 2.7mm Locking Drill Guide with 2.0mm Insert may be used in place of the Standard Drill Guide.
- The 2.7mm Locking Drill Guide-One Piece and 2.0mm Locking Drill Guide-One Piece may be substituted for the Locking Drill Guides with Inserts.
- Locking screws may be inserted on power, but should always be tightened by hand. Tightening screws on power may cause loss of reduction, exposure of the screw head to excessive torque or damage to the drill.

2.7mm Cortex Screw Technique

- Drill with the Short 2.0mm Drill Bit through the Drill Guide with 2.0mm Neutral Locking Hole Insert. Screw length may be determined by reading the calibrations on the Drill Bit or by using the 2.7mm Depth Gauge. If using the 2.7mm Depth Gauge, remove the Drill Guide for accurate measurement. Insert the appropriate length 2.7mm Cortex Screw using the 2.5mm Hexdriver.

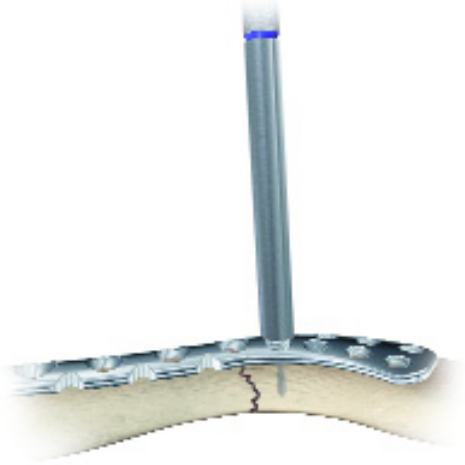


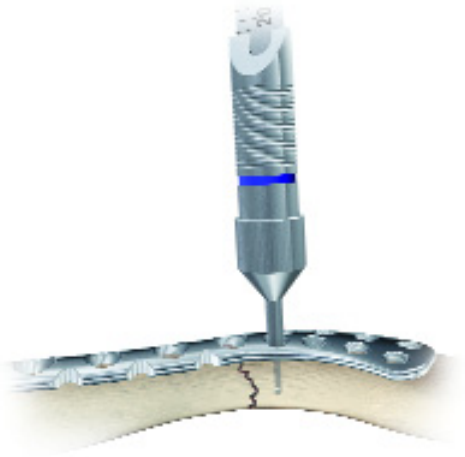


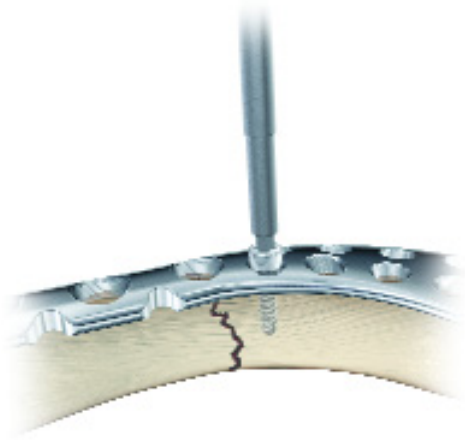


2.7mm Locking Screw Technique

- Thread the 2.7mm Locking Screw Guide with 2.0mm Insert into one of the three (3) distal locking holes. Drill with the Short 2.0mm Drill Bit and measure for screw length by reading the calibrations on the Drill Bit or by using the 2.7mm Depth Gauge. If using the Depth Gauge, remove the Locking Drill Guide for accurate measurement. Insert the appropriate length 2.7mm Locking Screw using the 2.5mm Hexdriver.

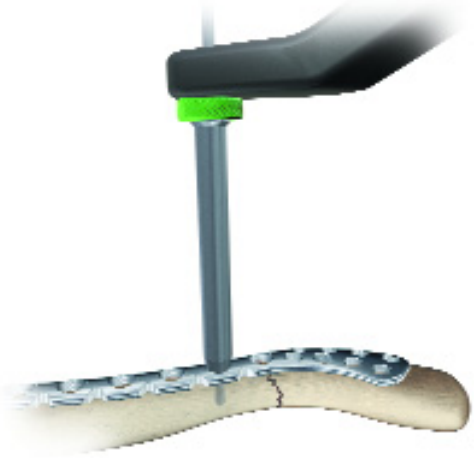


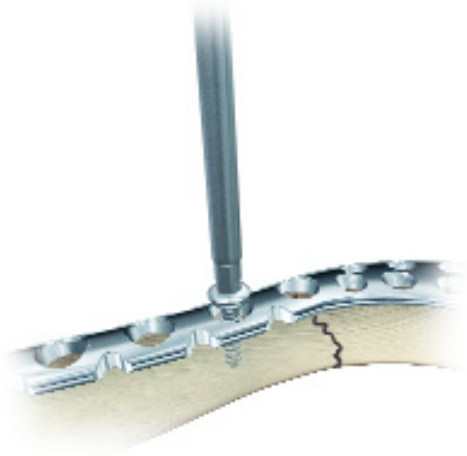




3.5mm Cortex Screw Technique

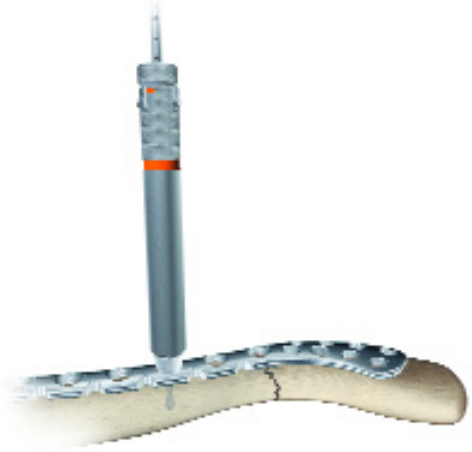
- Drill with the Short 2.7mm Drill Bit through the Drill Guide with 2.7mm Neutral Locking Hole Insert. Screw length may be determined by reading the calibrations on the Drill Bit or by using the 3.5mm Depth Gauge. If using the Depth Gauge, remove the Locking Drill Guide for accurate measurement. Insert the appropriate length screw with the 3.5mm Hexdriver.

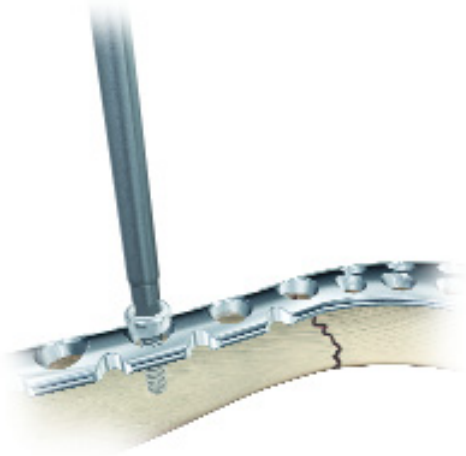




3.5mm Locking Screw Technique

- Thread the 3.5mm Locking Screw Guide with Insert into the screw hole. Drill with the Short 2.7mm Drill Bit and measure for screw length by reading the calibrations on the Drill Bit or by using the 3.5mm Depth Gauge. If using Depth Gauge, the Locking Drill Guide must be removed for accurate measurement. Insert the appropriate length screw using the 3.5mm Hexdriver.





Incision Closure

Verify fracture reduction under fluoroscopy and use the appropriate method for surgical closure of the incision.

Catalogue Information – Clavicle Plates
(Contained in the Elbow/2.7mm Plates)

Superior Medial Clavicle Plates

Cat. No.	Length	Minimum Suggested Qty	Maximum Tray Qty
7180-3401	8H Left 97mm	1	1
7180-3409	8H Right 97mm	1	1
7180-3402	10H Left 121mm	1	1
7180-3410	10H Right 121mm	1	1

Superior Distal Clavicle Plates

Cat. No.	Length	Minimum Suggested Qty	Maximum Tray Qty
7180-3403	Left 109mm	1	1
7180-3404	Right 109mm	1	1

Inferior Medial Clavicle Plates

Cat. No.	Length	Minimum Suggested Qty	Maximum Tray Qty
7180-3405	8H 96mm	0	1
7180-3406	10H 117mm	1	1

Inferior Distal Clavicle Plates

Cat. No.	Length	Minimum Suggested Qty	Maximum Tray Qty
7180-3407	81mm	0	1

Catalogue Information – Small Fragment System Screws

Small Fragment System 2.7mm Self-Tapping Cortex Screws (Non-Locking)

Cat. No.	Length	Minimum Suggested Qty	Maximum Tray Qty
7180-3010	10mm	3	3
7180-3012	12mm	3	3
7180-3014	14mm	3	3
7180-3016	16mm	3	3
7180-3018	18mm	3	3
7180-3020	20mm	3	3
7180-3022	22mm	3	3
7180-3024	24mm	3	3
7180-3026	26mm	3	3
7180-3028	28mm	3	3
7180-3030	30mm	3	3
7180-3032	32mm	3	3
7180-3034	34mm	3	3
7180-3036	36mm	3	3
7180-3038	38mm	3	3
7180-3040	40mm	3	3
7180-3045	45mm	3	3
7180-3050	50mm	3	3
7180-3055	55mm	3	3
7180-3060	60mm	3	3
7180-3065	65mm	3	3
7180-3070	70mm	3	3

Small Fragment System 3.5mm Self-Tapping Cortex Screws (Non-Locking)

Cat. No.	Length	Minimum Suggested Qty	Maximum Tray Qty
7180-4010A	10mm	5	5
7180-4012A	12mm	5	5
7180-4014A	14mm	5	5
7180-4016A	16mm	10	10
7180-4018A	18mm	10	10
7180-4020A	20mm	5	5
7180-4022A	22mm	5	5
7180-4024A	24mm	5	5
7180-4026A	26mm	5	5
7180-4028A	28mm	5	5
7180-4030A	30mm	5	5
7180-4032A	32mm	5	5
7180-4034A	34mm	5	5
7180-4036A	36mm	5	5
7180-4038A	38mm	5	5
7180-4040A	40mm	5	5
7180-4045	45mm	5	5
7180-4050	50mm	5	5
7180-4055	55mm	5	5
7180-4060	60mm	5	5
7180-4065	65mm	5	5
7180-4070	70mm	5	5
7180-4075	75mm	5	5
7180-4080	80mm	5	5
7180-4085	85mm	0	0
7180-4090	90mm	0	0
7180-4095	95mm	0	0
7180-4100	100mm	0	0
7180-4105	105mm	0	0
7180-4110	110mm	0	0

Small Fragment System
2.7mm Locking Self-Tapping Cortex Screws

Cat. No.	Length	Minimum Suggested Qty	Maximum Tray Qty
7180-2310	10mm	4	4
7180-2312	12mm	4	4
7180-2314	14mm	4	4
7180-2316	16mm	4	4
7180-2318	18mm	4	4
7180-2320	20mm	4	4
7180-2322	22mm	4	4
7180-2324	24mm	4	4
7180-2326	26mm	4	4
7180-2328	28mm	4	4
7180-2330	30mm	4	4
7180-2332	32mm	2	4
7180-2334	34mm	2	4
7180-2336	36mm	2	4
7180-2338	38mm	2	4
7180-2340	40mm	4	4
7180-2345	45mm	4	4
7180-2350	50mm	8	8
7180-2355	55mm	2	4
7180-2360	60mm	2	4

Small Fragment System
3.5mm Locking Self-Tapping Cortex Screws

Cat. No.	Length	Minimum Suggested Qty	Maximum Tray Qty
7180-5010	10mm	5	5
7180-5012	12mm	5	5
7180-5014	14mm	5	5
7180-5016	16mm	10	10
7180-5018	18mm	10	10
7180-5020	20mm	5	5
7180-5022	22mm	5	5
7180-5024	24mm	5	5
7180-5026	26mm	5	5
7180-5028	28mm	5	5
7180-5030	30mm	5	5
7180-5032	32mm	5	5
7180-5034	34mm	5	5
7180-5036	36mm	5	5
7180-5038	38mm	5	5
7180-5040	40mm	5	5
7180-5045	45mm	5	5
7180-5050	50mm	5	5
7180-5055	55mm	5	5
7180-5060	60mm	5	5
7180-5065	65mm	5	5
7180-5070	70mm	5	5
7180-5075	75mm	5	5
7180-5080	80mm	5	5
7180-5085	85mm	0	0
7180-5090	90mm	0	0
7180-5095	95mm	0	0
7180-5100	100mm	0	0
7180-5105	105mm	0	0
7180-5110	110mm	0	0

Catalogue Information – Small Fragment System Instruments

Sharp Hook
Cat. No. 7117-0043

Hohmann Retractor, 8mm Width
Cat. No. 7117-0057

Hohmann Retractor, 15mm Width
Cat. No. 7117-0095

Hohmann Retractor Bent, 8mm
Cat. No. 7117-3369

Wire Bending Pliers, 140mm Length
Cat. No. 7117-0063

Bending Pliers for 2.7mm
& 3.5mm Plates
Cat. No. 7117-0076

Bending Pliers for 3.5mm
Reconstruction Plates
Cat. No. 7117-0175

Periosteal Elevator 6mm, Rounded
Cat. No. 7117-0097

Universal Plate Bending Irons
Cat. No. 7117-3367

Small Fragment Countersink
Cat. No. 7117-3344

Reduction Forceps w/Ratchet-Bowed, 205mm
Cat. No. 7117-3370

Reduction Forceps w/Points, Broad
Cat. No. 7117-3377

Reduction Forceps w/Serrated Jaw
Cat. No. 7117-3378

3.5mm Locking Screw Guide
Cat. No. 7117-3538

2.7mm Locking Drill Guide Insert
Cat. No. 7117-3529

2.7mm Locking Drill Guide – One Piece
(Optional)
Cat. No. 7117-3450

Universal Drill Guide Handle
Cat. No. 7117-3349

2.0mm Wire/Drill Insert
Cat. No. 7117-3517

2.7mm Drill Guide Insert
Cat. No. 7117-3510

3.5mm Drill Guide Insert
Cat. No. 7117-3513

2.7mm Neutral Locking Hole Insert
Cat. No. 7117-3514

2.7mm Compression Locking Hole Insert
Cat. No. 7117-3515

2.7mm Neutral Slot Insert
Cat. No. 7117-3512

2.7mm Compression Slot Insert
Cat. No. 7117-3511

2.0mm Parallel Wire/Drill Guide
Cat. No. 7117-3516

Short 3.5mm Screw Depth Gauge
Cat. No. 7117-3523

2.7mm Screw Depth Gauge
Cat. No. 7117-3525

3.5mm Screw Depth Gauge
Cat. No. 7117-3534

Cannulated Bending Irons for K-wires
Cat. No. 7117-3527

Cannulated AO to Trinkle Adaptor
Cat. No. 7117-3528

Small T-Handle, Quick Coupling
Cat. No. 7117-3542

Tear Drop Handle Screwdriver w/Quick Connect
Cat. No. 7117-3543

Large Screwdriver Handle
Cat. No. 7117-3547

Self Centering Reverse Verbrugge, 190mm
Cat. No. 7117-3544

2.5mm Hexdriver Shaft w/AO Quick Connect
Cat. No. 7117-3535

3.5mm Hexdriver Shaft w/AO Quick Connect
Cat. No. 7117-3537

Drill Guide Removal Tool
Cat. No. 7117-3549

2.0mm Locking Drill Guide
Cat. No. 7117-3448

2.0mm Locking Drill Guide Insert
Cat. No. 7117-3449

2.7mm Locking Screw Guide
Cat. No. 7117-3452

2.0mm Neutral Locking Hole Insert
Cat. No. 7117-3453

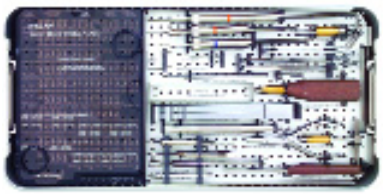
2.7mm Screw Guide Remover
Cat. No. 7117-3455

Catalogue Information – Small Fragment System Trays

Small Outer Case – 2.4"
Cat. No. 7112-XXXX

Lid for Outer Cases
Cat. No. 7112-9402

PERI-LOC◇ Small Fragment Instrument Tray
Cat. No. 7652-XXXX



Catalogue Information – Small Fragment System Disposables

K-Wires with Trocar Point and Threaded Pins

Cat. No.	Description	Maximum Tray Qty
7116-1012	1.25mm x 150mm	6
7116-1016	1.6mm x 150mm	6
7116-1020	2.0mm x 150mm	6

Taps with Quick Connect

Cat. No.	Description	Maximum Tray Qty
7117-3318	3.5mm	2
7117-3366	2.7mm	2
7117-3386	4.0mm Cancellous	2

Provisional Fixation Pins

Cat. No.	Description	Maximum Tray Qty
7117-3322	2.7mm x 18mm	4
7117-3323	2.7mm x 40mm	4

Drill Bits with Quick Connect

Cat. No.	Description	Maximum Tray Qty
7117-3501	2.0mm	2
7117-3502	2.7mm Short	2
7117-3503	2.7mm	2
7117-3504	3.5mm Short	2

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