

SURGICAL TECHNIQUE FOR METACARPAL USE OF

NON-STERILE NX NAIL SYSTEM



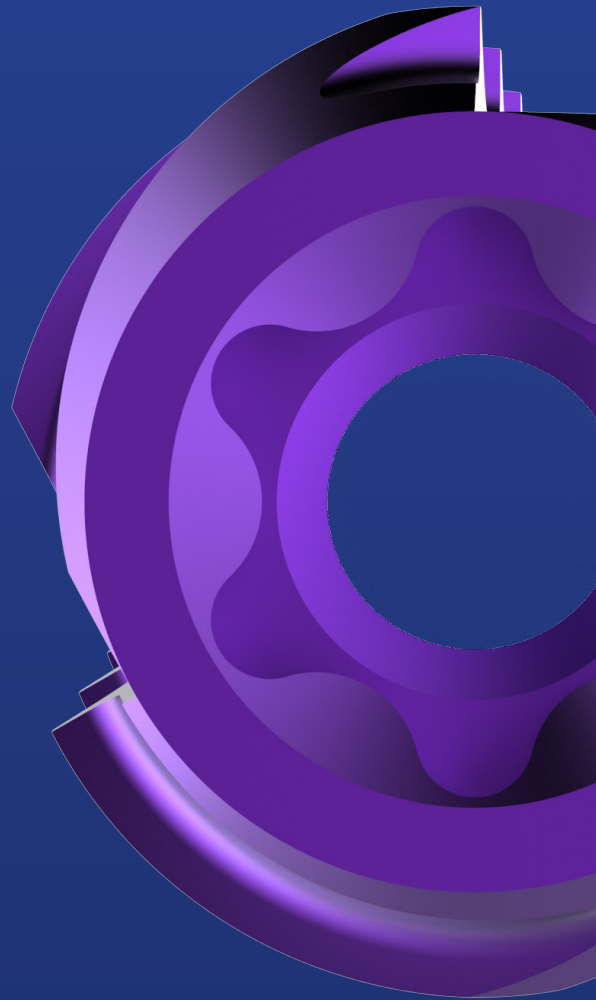
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INDICATIONS FOR USE

The FO BTES Screw and NX Nail range are intended for use in the fixation of fractures, osteotomies, and arthrodesis, appropriate for the size of the device, in adults and both children (2-12 years) and adolescents (12-21 years), in which growth plates have fused or in which growth plates will not be crossed by screw fixation.




PROCEDURAL TECHNIQUE

PREOPERATIVE PLANNING

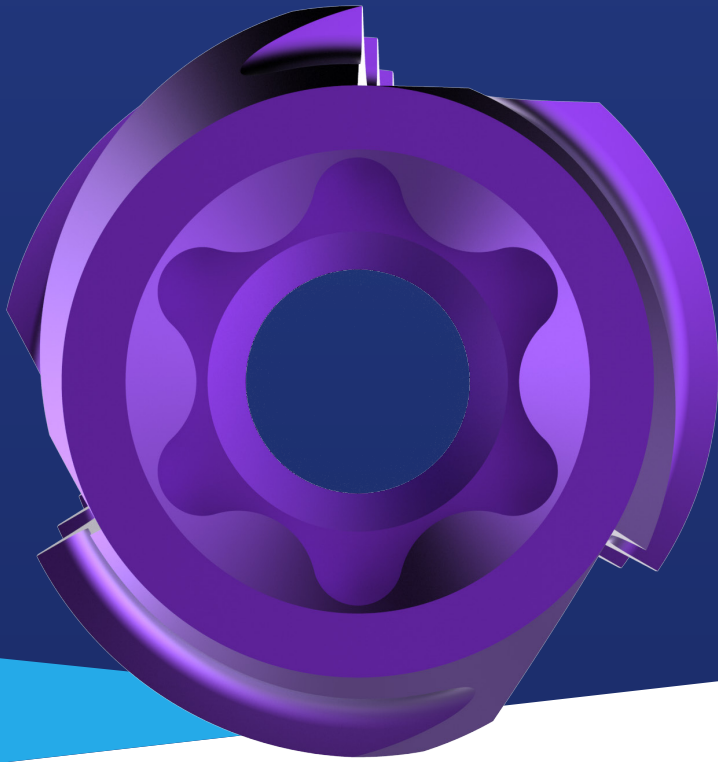
Each of the five metacarpals in the hand is unique in its anatomy. Convex dorsally, concave in the volar aspect and differing in length and shape, metacarpals require consideration in three dimensions.

Review Radiographs

- If crossing the isthmus, identify the size and location to ensure the leading tip can pass through without causing fracture or getting lodged.

 **TIP:** To overcome the limitations of two-dimensional radiographs, take measurements on multiple projection angles where possible and use the smallest of these measurements taking into account the shape of the isthmus.






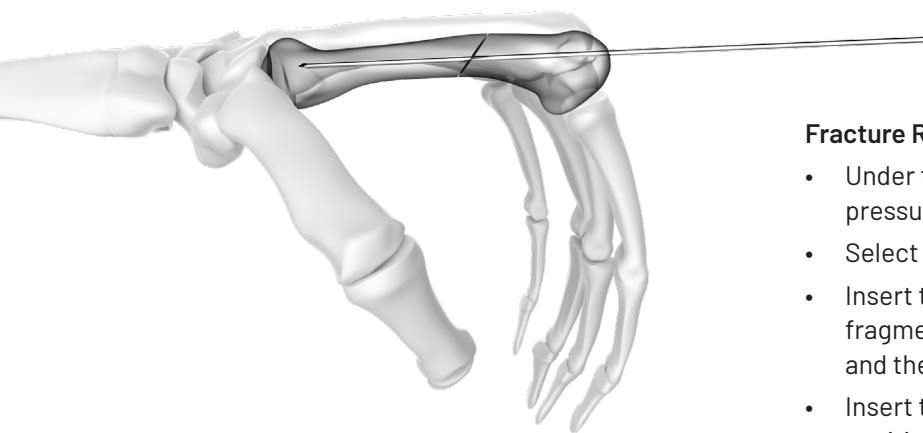
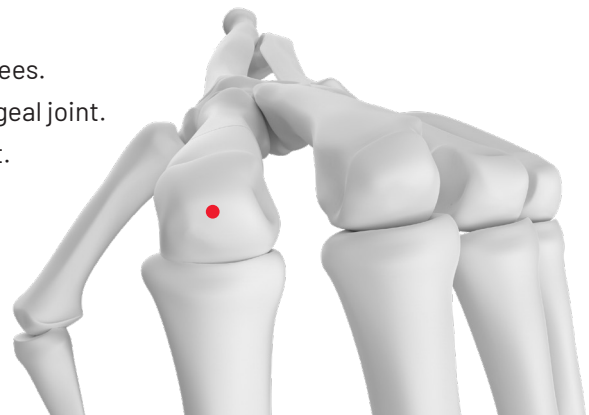
STEP 1: REDUCTION AND TEMPORARY FIXATION

The precision cannulation of the NX Nail provides accurate reduction and temporary fixation during implant preparation and insertion.

Approach


- Using the retrograde technique, flex the finger to 90 degrees.
- Make a small incision (2-3mm) over the metacarpophalangeal joint.
- Identify the dorsal third of the head for the insertion point.

 **TIP:** The dorsal third represents the ideal entry point of the K-wire in the sagittal plane, extending a line through the centre of the canal and exiting at the base.



Fracture Reduction

- Under fluoroscopy, use distraction and indirect pressure to anatomically reduce the fracture.
- Select the K-wire from the instrument kit.
- Insert the K-wire in the longitudinal axis of the distal fragment centred in the head in the coronal plane and the dorsal third in the sagittal plane.
- Insert the K-wire to the depth of the implant's final position to ensure correct length measurement

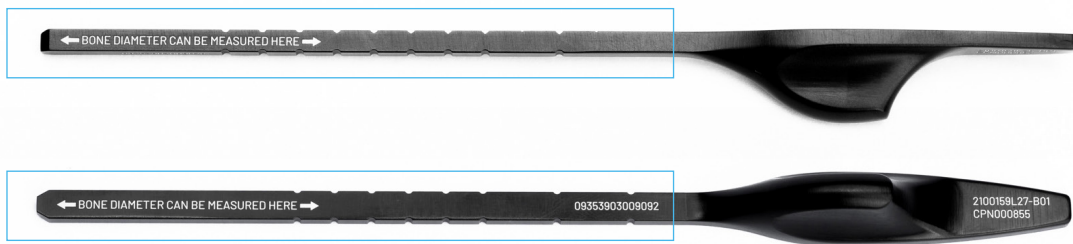
 **TIP:** A minimal approach to the fracture can be made to facilitate accurate reduction if required.

STEP 2: CONFIRM DIAMETER

- Using the depth gauge, ensure the text BONE DIAMETER CAN BE MEASURED HERE is facing up. The position of this text can change throughout the size range so take care to identify it and ensure it is facing up.
- Under fluoroscopy, using the projection angle which gave the smallest isthmus measurement, align the template with the borders of the isthmus.
- Refer to available size range at the back of this document.
- Select a size smaller than the line-to-line fit to ensure the implant can pass through the isthmus without making contact with cortical bone.



TIP: The NX Nail achieves stability with the compaction taper head and leading tip. There is no need to achieve fixation within the isthmus. If presented with a line-to-line fit or "beyond", consider downsizing to avoid stuffing the isthmus.



The images below show the fourth and fifth metacarpal of a healthy 50yo male with three different template and implant sizes to compare the ability of the leading tip to safely pass through the isthmus.

RECOMMENDED		NOT ADVISED - TAKE CAUTION		DO NOT PROCEED	
2.0 Template	2.0 Implant	2.5 Template	2.5 Implant	3.0 Template	3.0 Implant
Shows some radiolucency at the isthmus. This scenario represents the ideal fit.		Shows no radiolucency at the isthmus. In this scenario, consider downsizing or using the drill bit from the next size up to open the isthmus.		Shows the template sitting over cortical bone at the isthmus. This size is too large.	

STEP 3: CONFIRM LENGTH

- Hold gauge against the metacarpal head with the protruding K-wire seated in the groove along the shaft of the depth gauge.
- Measure the exposed length of the K-wire against the markings along the shaft of the depth gauge. This indicates the length to which the K-wire has been inserted.
- Notches along the length of the depth gauge allow for direct measurement under fluoroscopy and match the available implant lengths.



TIP: It may be appropriate to subtract up to 6mm to ensure correct implant placement.





STEP 4: BONE PREPARATION

The NX Nail compaction taper head is designed to circumferentially displace and compact cancellous bone to increase relative density and load the bone. Strong fixation and rotational control are generated by the interference fit between the implant threads and the bone.

The metaphyseal drill is provided to prepare the bone for the shape of the implant head and alleviate head forces. Instrument dimensions match the implant, excluding threads.

Use of the metaphyseal drill is recommended for every case.



Drill Insertion Tunnel

- Ensure the K-wire is seated securely.
- Pass the cannulated drill bit over the K-wire and drill the insertion tunnel.
- At a minimum the drill should be passed beyond the isthmus, taking care to not drill beyond the length of the K-wire which may result in loss of purchase and placement of the K-wire.
- During drill removal, take care to maintain the position of the K-wire which remains in situ.

Standard Meta Drill

- Matches implant excluding threads.
- One colour band corresponding to size range.
- No laser marking band on head.



Extended Meta Drill

- Matches implant excluding threads with 2mm extension of taper.
- Facilitates deeper insertion or alleviates head forces.
- Two colour bands, one corresponds to size range the other distinguishes from standard meta drill.
- Laser marking band identifies 2mm taper extension.




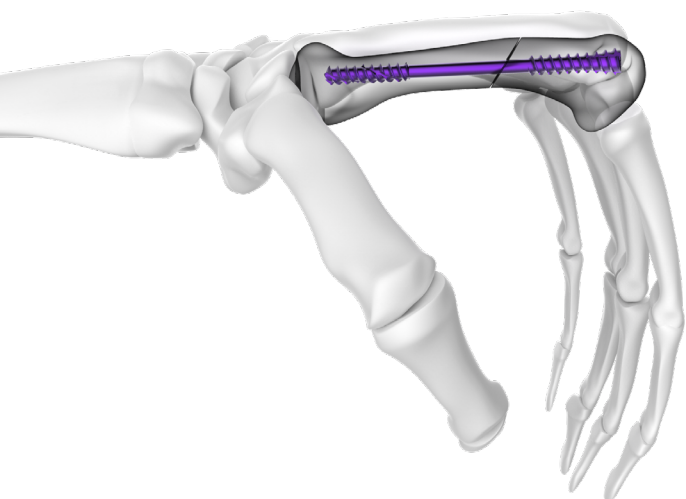
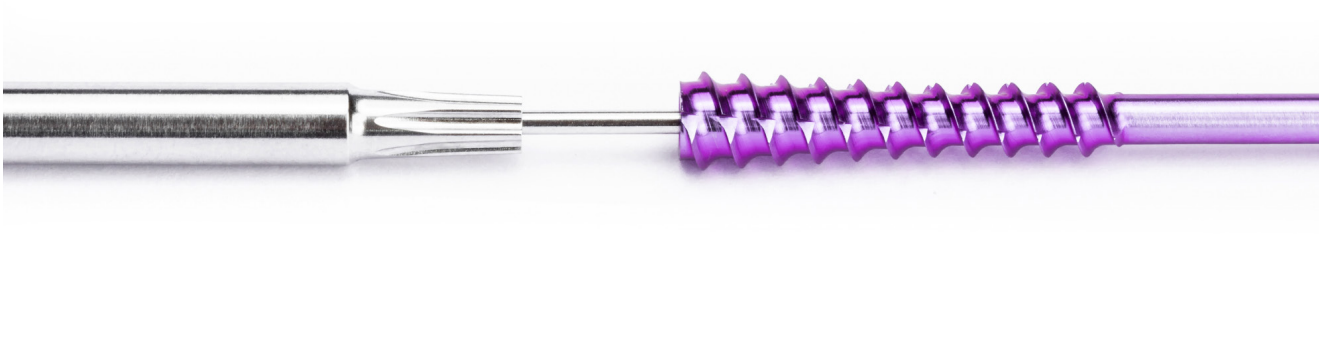
Metaphyseal Preparation

- Connect the metaphyseal drill to the handle included in the instrument kit.
- Pass the metaphyseal drill over the K-wire.
- If using the standard meta drill, sink the head completely. This will provide a tight interference fit.
- If using the extended meta drill, at a minimum sink the drill head to the bottom of the black laser marking band (leaving it visible). This will provide a tight interference fit. To alleviate head forces further, sink the drill head to the top of the laser marking band.
- During the metaphyseal drill removal, take care to maintain the position of the K-wire that remains in situ.

STEP 5: IMPLANT INSERTION

- Connect the driver to the handle included in the instrument kit.
- When connecting the driver tip to the implant head, push firmly to ensure the instrument is fully seated.
- Pass the implant over the K-wire and turn in a clockwise direction.
- During insertion, pay attention to the bone while seating the head and take care to avoid distraction or rotating the fracture.
- If resistance is felt, check under fluoroscopy.

 **TIP:** If you encounter resistance either over-drill with the drill bit from the next size up, taking care not to drill beyond the isthmus, or downsize and consider using a longer implant.




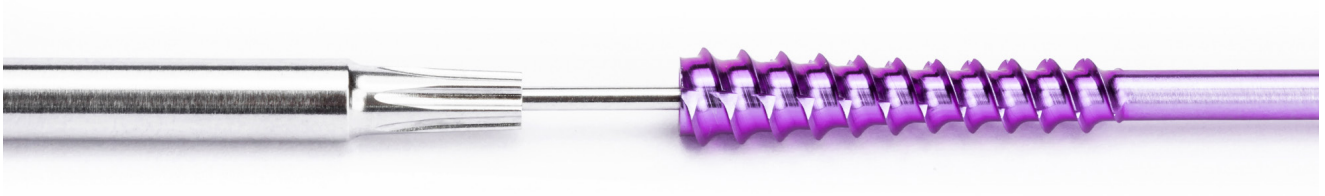
STEP 6: CLOSE

- Remove the K-wire and close using preferred method.

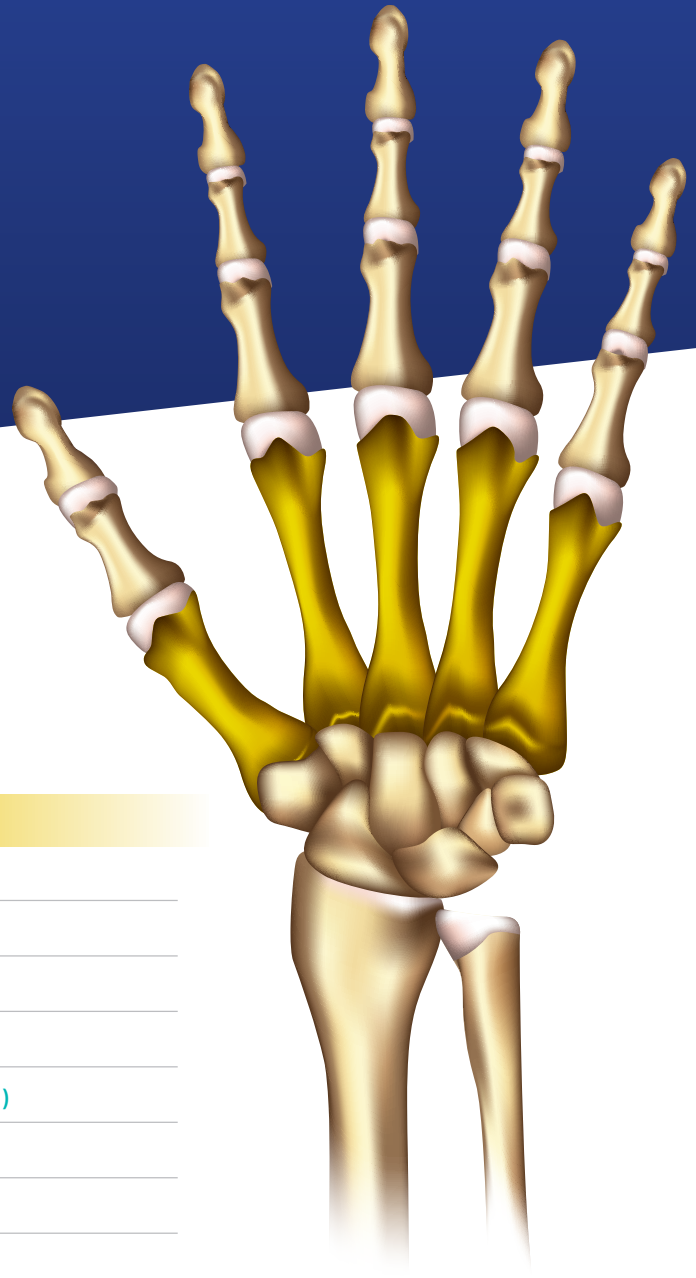
REMOVAL

- If implant removal is required post operatively, use a K-wire to find the cannulation in the implant.
- Pass the driver over the K-wire and fully seat the instrument in the implant head.
- Make sure the driver and implant interface is precisely aligned in the axial direction.
- Rotate the driver anti-clockwise until the implant is free.

 **TIP:** In the presence of an acceptable deformity a bent implant may be left in situ and the hand treated conservatively.



METACARPAL SIZE GUIDE



METACARPAL

INDICATION	Thumb, 2nd, 3rd, 4th, 5th
SIZE RECOMMENDATION	2.0 - 4.0mm
LENGTH RANGE	2.0 - 12 - 40mm (4th MC)
	2.5: 12 - 60mm (5th MC)
	3.0: 25 - 70mm (2nd + 3rd MC)
	3.5: 25 - 70mm
	4.0: 35 - 80mm

COLOUR	SIZE	LENGTH	IMAGE
GOLD	2.0mm	12 - 40mm	
MAGENTA	2.5mm	12 - 60mm	
TEAL	3.0mm	25 - 70mm	
PURPLE	3.5mm	25 - 70mm	
BRONZE	4.0mm	35 - 80mm	
GREY	5.0mm	35 - 90mm	

NON-STERILE NX NAIL SYSTEM CATALOGUE

2.0MM NAIL SYSTEM



CAT NO. / REF NO.	DESCRIPTION	QTY
INSTRUMENTS		
KWDT-08100/5	0.8mm x 100mm K-wire	5
NXDG-20/1	2.0mm NX Depth Gauge	1
NXMD-20/1	2.0 Metaphyseal Cannulated Hand Drill	1
NXED-20/1	2.0 Extended Metaphyseal Cannulated Hand Drill	1
NXDL(c)-150/1	1.5mm Cannulated Drill Bit	2
NXHX(c)-15/1	1.5mm Cannulated Hex Driver	2
BTSC00030	Small Surgical Handle	1
NXLD/1	NX Nail System Tray Lid	1
NXTY-20/1	2.0mm NX Nail System Tray	1
IMPLANTS		
NXNC-2012/1	2.0mm x 12mm NX Nail	1
NXNC-2014/1	2.0mm x 14mm NX Nail	1
NXNC-2016/1	2.0mm x 16mm NX Nail	1
NXNC-2018/1	2.0mm x 18mm NX Nail	1
NXNC-2020/1	2.0mm x 20mm NX Nail	4
NXNC-2022/1	2.0mm x 22mm NX Nail	4
NXNC-2024/1	2.0mm x 24mm NX Nail	4
NXNC-2026/1	2.0mm x 26mm NX Nail	4
NXNC-2028/1	2.0mm x 28mm NX Nail	4
NXNC-2030/1	2.0mm x 30mm NX Nail	4
NXNC-2032/1	2.0mm x 32mm NX Nail	4
NXNC-2034/1	2.0mm x 34mm NX Nail	4
NXNC-2036/1	2.0mm x 36mm NX Nail	4
NXNC-2038/1	2.0mm x 38mm NX Nail	4
NXNC-2040/1	2.0mm x 40mm NX Nail	4

NON-STERILE NX NAIL SYSTEM CATALOGUE

2.5MM NAIL SYSTEM



CAT NO. / REF NO.	DESCRIPTION	QTY
INSTRUMENTS		
KWDT-10100/5	1.0mm x 100mm K-wire	5
NXDG-25/1	2.5mm NX Depth Gauge	1
NXMD-25/1	2.5 Metaphyseal Cannulated Hand Drill	1
NXED-25/1	2.5 Extended Metaphyseal Cannulated Hand Drill	1
NXDL(c)-175/1	1.75mm Cannulated Drill Bit	2
NXHX(c)-17/1	1.7mm Cannulated Hex Driver	2
BTSC00030	Small Surgical Handle	1
NXLD/1	NX Nail System Tray Lid	1
NXTY-25/1	2.5mm NX Nail System Tray	1
IMPLANTS		
NXNC-2512/1	2.5mm x 12mm NX Nail	2
NXNC-2514/1	2.5mm x 14mm NX Nail	2
NXNC-2516/1	2.5mm x 16mm NX Nail	2
NXNC-2518/1	2.5mm x 18mm NX Nail	2
NXNC-2520/1	2.5mm x 20mm NX Nail	2
NXNC-2525/1	2.5mm x 25mm NX Nail	2
NXNC-2530/1	2.5mm x 30mm NX Nail	2
NXNC-2535/1	2.5mm x 35mm NX Nail	2
NXNC-2540/1	2.5mm x 40mm NX Nail	2
NXNC-2545/1	2.5mm x 45mm NX Nail	2
NXNC-2550/1	2.5mm x 50mm NX Nail	2
NXNC-2555/1	2.5mm x 55mm NX Nail	2
NXNC-2560/1	2.5mm x 60mm NX Nail	2

NON-STERILE NX NAIL SYSTEM CATALOGUE

3.0MM NAIL SYSTEM



CAT NO. / REF NO.	DESCRIPTION	QTY
INSTRUMENTS		
KWDT-10100/5	1.0mm x 100mm K-wire	5
NXDG-30/1	3.0mm NX Depth Gauge	1
NXMD-30/1	3.0 Metaphyseal Cannulated Hand Drill	1
NXED-30/1	3.0 Extended Metaphyseal Cannulated Hand Drill	1
NXDL(c)-200/1	2.0mm Cannulated Drill Bit	2
NXTX(c)-T8/1	T8 Cannulated Torx Driver	2
NXLH/1	Large Ratcheting Surgical Handle	1
NXLD/1	NX Nail System Tray Lid	1
NXTY-30/1	3.0mm NX Nail System Tray	1
IMPLANTS		
NXNC-3025/1	3.0mm x 25mm NX Nail	2
NXNC-3030/1	3.0mm x 30mm NX Nail	2
NXNC-3035/1	3.0mm x 35mm NX Nail	2
NXNC-3040/1	3.0mm x 40mm NX Nail	2
NXNC-3045/1	3.0mm x 45mm NX Nail	2
NXNC-3050/1	3.0mm x 50mm NX Nail	2
NXNC-3055/1	3.0mm x 55mm NX Nail	2
NXNC-3060/1	3.0mm x 60mm NX Nail	2
NXNC-3070/1	3.0mm x 70mm NX Nail	2

NON-STERILE NX NAIL SYSTEM CATALOGUE

3.5MM NAIL SYSTEM



CAT NO. / REF NO.	DESCRIPTION	QTY
INSTRUMENTS		
KWDT-12150/5	1.2mm x 150mm K-wire	5
NXDG-35/1	3.5mm NX Depth Gauge	1
NXMD-35/1	3.5 Metaphyseal Cannulated Hand Drill	1
NXED-35/1	3.5 Extended Metaphyseal Cannulated Hand Drill	1
NXDL(c)-240/1	2.4mm Cannulated Drill Bit	2
NXTX(c)-T10/1	T10 Cannulated Torx Driver	2
NXLH/1	Large Ratcheting Surgical Handle	1
NXLD/1	NX Nail System Tray Lid	1
NXTY-35/1	3.5mm NX Nail System Tray	1
IMPLANTS		
NXNC-3525/1	3.5mm x 25mm NX Nail	2
NXNC-3530/1	3.5mm x 30mm NX Nail	2
NXNC-3535/1	3.5mm x 35mm NX Nail	2
NXNC-3540/1	3.5mm x 40mm NX Nail	2
NXNC-3545/1	3.5mm x 45mm NX Nail	2
NXNC-3550/1	3.5mm x 50mm NX Nail	2
NXNC-3555/1	3.5mm x 55mm NX Nail	2
NXNC-3560/1	3.5mm x 60mm NX Nail	2
NXNC-3570/1	3.5mm x 70mm NX Nail	2

NON-STERILE NX NAIL SYSTEM CATALOGUE

4.0MM NAIL SYSTEM



CAT NO. / REF NO.	DESCRIPTION	QTY
INSTRUMENTS		
KWDT-12150/5	1.2mm x 150mm K-wire	5
NXDG-40/1	4.0mm NX Depth Gauge	1
NXMD(c)-40/1	4.0mm Metaphyseal Cannulated Hand Drill	1
NXED-40/1	4.0 Extended Metaphyseal Cannulated Hand Drill	1
NXDL(c)-275/1	2.75mm Cannulated Drill Bit	2
NXTX(c)-T15/1	T15 Cannulated Torx Driver	2
NXLH/1	Large Ratcheting Surgical Handle	1
NXLD/1	NX Nail System Tray Lid	1
NXTY-40/1	4.0mm NX Nail System Tray	1
IMPLANTS		
NXNC-4035/1	4.0mm x 35mm NX Nail	2
NXNC-4040/1	4.0mm x 40mm NX Nail	2
NXNC-4045/1	4.0mm x 45mm NX Nail	2
NXNC-4050/1	4.0mm x 50mm NX Nail	2
NXNC-4055/1	4.0mm x 55mm NX Nail	2
NXNC-4060/1	4.0mm x 60mm NX Nail	2
NXNC-4070/1	4.0mm x 70mm NX Nail	2
NXNC-4080/1	4.0mm x 80mm NX Nail	2

NON-STERILE NX NAIL SYSTEM CATALOGUE

5.0MM NAIL SYSTEM



CAT NO. / REF NO.	DESCRIPTION	QTY
INSTRUMENTS		
KWDT-16150/5	1.6mm x 150mm K-wire	5
NXDG-50/1	5.0mm NX Depth Gauge	1
NXMD(c)-50/1	5.0mm Metaphyseal Cannulated Hand Drill	1
NXED-50/1	5.0 Extended Metaphyseal Cannulated Hand Drill	1
NXDL(c)-350/1	3.5mm Cannulated Drill Bit	2
NXTX(c)-T20/1	T20 Cannulated Torx Driver	2
NXLH/1	Large Ratcheting Surgical Handle	1
NXLD/1	NX Nail System Tray Lid	1
NXTY-50/1	5.0mm NX Nail System Tray	1
IMPLANTS		
NXNC-5035/1	5.0mm x 35mm NX Nail	2
NXNC-5040/1	5.0mm x 40mm NX Nail	2
NXNC-5045/1	5.0mm x 45mm NX Nail	2
NXNC-5050/1	5.0mm x 50mm NX Nail	2
NXNC-5055/1	5.0mm x 55mm NX Nail	2
NXNC-5060/1	5.0mm x 60mm NX Nail	2
NXNC-5070/1	5.0mm x 70mm NX Nail	2
NXNC-5080/1	5.0mm x 80mm NX Nail	2
NXNC-5090/1	5.0mm x 90mm NX Nail	2

FIELD ORTHOPAEDICS

Get in touch with your local sales representative today to discuss how NX Nail can meet your hand trauma needs.

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MANUFACTURER

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