

Smith+Nephew

Ti6[◇]

Internal Fixation System

Surgical Technique



Table of contents

Design rationale 1

Surgical Technique 2

Titanium Cannulated TC - Series 2

Titanium Headless TH - Series..... 3

Titanium QuickSnap TQ - Series..... 4

Titanium Solid TS - Series..... 5

Digital Fusion DS - Series 6

Instrumentation and Ordering Information 7

Design rationale

The Ti6[®] Internal Fixation System was designed to give surgeons and facilities a modular system including Cannulated 2.0/2.5, Cannulated 3.0/4.0, Headless 2.5/3.0, QuickSnap 2.0/2.7, Digital Fusion 2.0, Solid 2.0/2.5 and Solid 3.0/4.0 trays to meet the needs and preferences of a wide array of potential users. The Ti6 system includes five separate trays:



Base Instruments



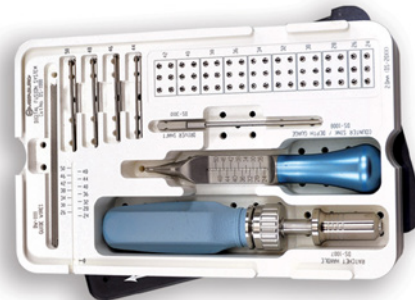
**Titanium Cannulated
TC-Series**



**Titanium Headless/
QuickSnap TH/
TQ-Series**



**Titanium Solid
TS-Series**



**Digital Fusion
DS-Series**

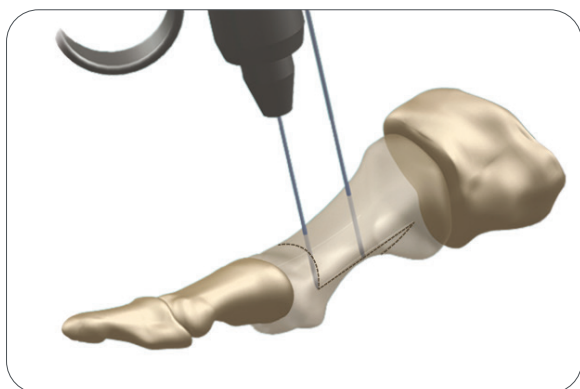


Figure 1-1

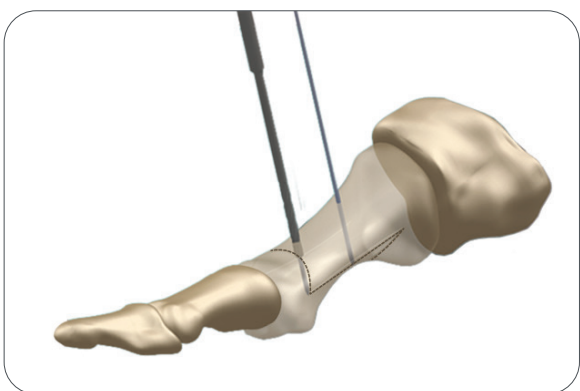


Figure 1-2

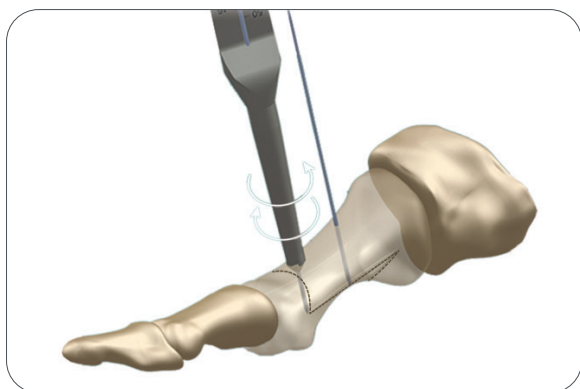


Figure 1-3

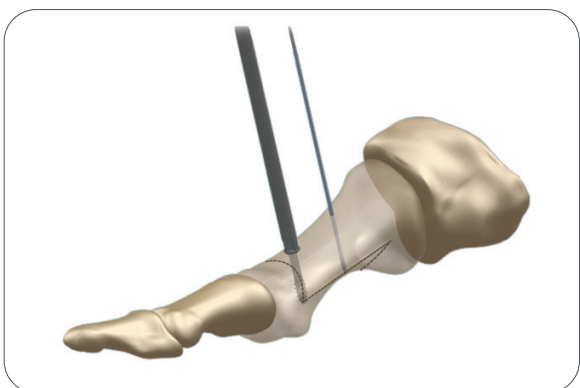


Figure 1-4

Surgical technique

Titanium Cannulated TC - Series

The TC-Series implant features a low profile head and an aggressive hybrid thread pattern. The TC-Series system is comprised of cannulated instrumentation, including a combination countersink depth gauge. The implants are offered in four diameters and various lengths:

Diameters	Lengths
2.0mm	6-22mm
2.5mm	8-30mm
3.0mm	10-40mm
4.0mm	12-50mm

Instrument use guide

1-1 After making the appropriate bone cuts, insert the guide wire to the correct depth using image intensification, if necessary. Temporary clamping or manual compression of the bone segments can provide more accurate measurement and improve screw engagement into the far side of the osteotomy site. Drive the guide wire using 15–20mm increments to avoid bending the guide wire.

1-2 For all screw sizes, pre-drilling the proximal cortex can assist with screw insertion in dense bone. Use the optional 2.0/2.5 or 3.0/4.0 cannulated over-drill for this step.

1-3 Countersink and then measure using the combination countersink depth gauge instrument. Use a reciprocating motion to create the countersink recess and measure after countersinking. Intra-operative radiographs should be taken to confirm proper placement of the guide wire.

1-4 Slide the TC-Series screw over the guide wire, and drive the screw until it is flush with the bone surface. If the screw meets unusual resistance, remove the guide wire and continue driving the screw. If unusual resistance is still experienced, do not attempt to drive the screw.



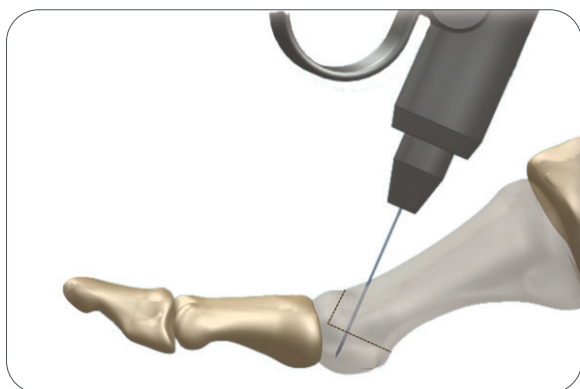


Figure 2-1



Figure 2-2

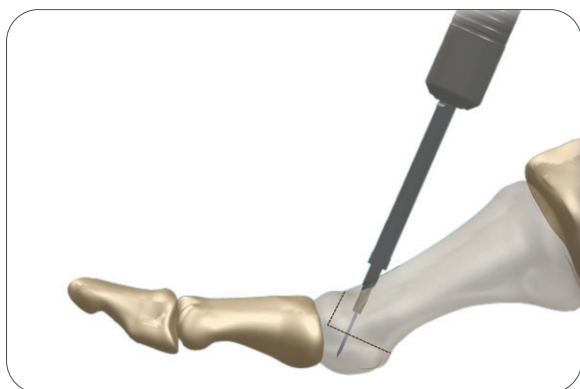


Figure 2-3



Figure 2-4

Titanium Headless TH - Series

The TH-Series implant is a dual thread cannulated bone screw. This implant offers a variable pitched thread, designed to create maximum compression and can be implanted below the bone surface. The implants are offered in two diameters and various lengths:

Diameters	Lengths
2.5mm	10 - 22mm
3.0mm	14 - 34mm

Instrument use guide

2-1 After making the appropriate bone cuts, drive the TH-Series guide wire to the correct depth using image intensification, if necessary. Temporary clamping or manual compression of the bone segments can provide more accurate measurement and improve screw engagement into the far side of the osteotomy site. Drive the guide wire using 10 – 15mm increments to prevent bending the wire.

2-2 Measure for the proper screw length by sliding the TH-Series depth gauge over the K-wire until it reaches the bone surface.

2-3 Use the TH-Series Cannulated Relief Drill to enlarge the proximal cortex.

Important: Drill to the 1st step notch for 2.5mm screws and all the way to the drill base for the 3.0mm screws.

2-4 Slide the screw and driver shaft over the K-wire, and drive the screw through the bone until the top of the screw sits just below the bone surface. If the screw meets unusual resistance, remove the guide wire and continue driving the screw using the TH series solid screw driver. The TH series solid screw driver should also be used for screw removal. If unusual resistance is still experienced, do not attempt to drive the screw.



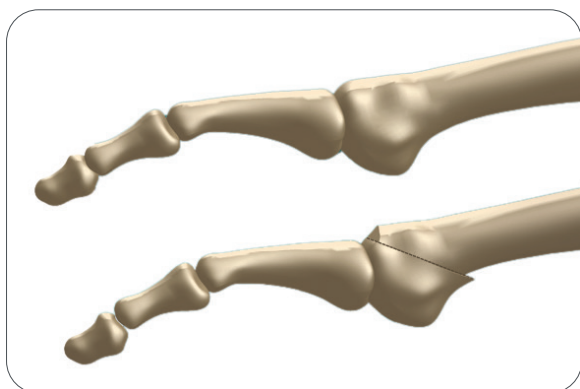


Figure 3-1

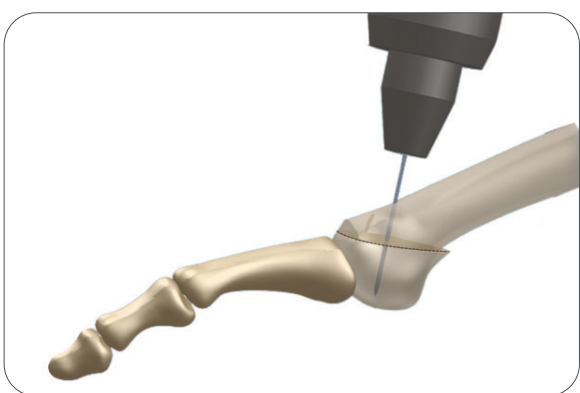


Figure 3-2

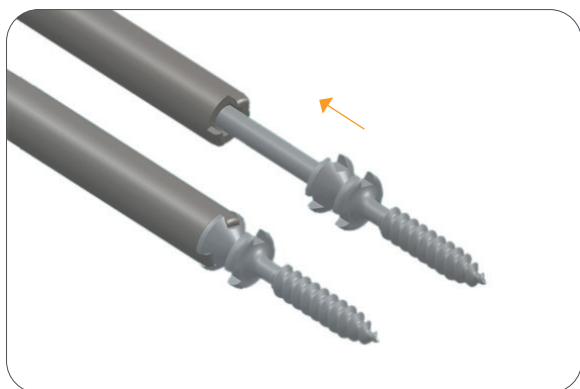


Figure 3-3

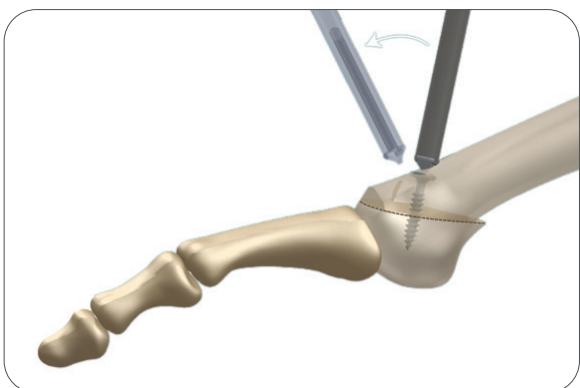


Figure 3-4

Titanium QuickSnap TQ - Series

The TQ-Series implant is specifically designed for lesser metatarsal and small bone procedures. This implant features a snap-off shank designed to break away when the screw head makes contact with the proximal bone surface. The TQ-Series implants feature a self-drilling tip designed to engage the bone surface at the point of first contact. The implants are available in two diameters and various lengths:

Diameters	Lengths
2.0mm	8-16mm
2.7mm	12-22mm

Instrument use guide

- 3-1** Perform the appropriate cuts for the lesser metatarsal procedure, and remodel the dorsal shelf.
- 3-2** The surgeon can choose to use the guide wire to initiate a 1mm deep pilot hole that penetrates the proximal cortex. However, the TQ-Series screw is self-drilling and self-tapping.
- 3-3** Load the QuickSnap screw into the QuickSnap Driver until the proximal head is engaged by the 3 prongs.

Using a Wire Driver: The QuickSnap screw is also designed to be driven with a wire driver. Use the 3 prong driver to complete insertion if the screw snaps off before reaching the proximal cortex.

- 3-4** While compressing the osteotomy site with manual or clamp pressure, drive the screw until the distal head is flush with the proximal cortex. If unusual resistance is experienced, do not attempt to drive the screw.

Important: If the screw does not snap off after contacting the outer cortex, it may be necessary to snap it by tilting the driver back and forth.



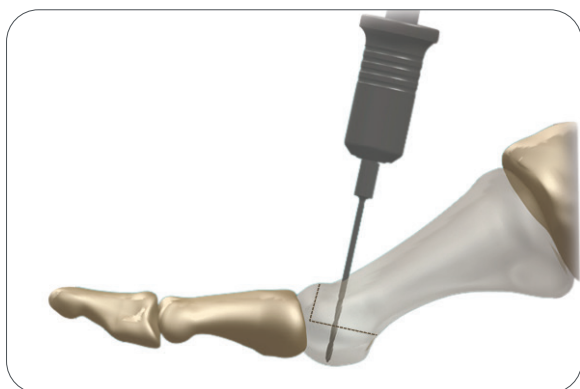


Figure 1-1

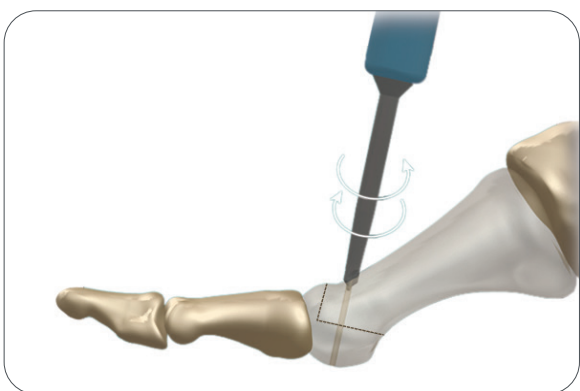


Figure 1-2

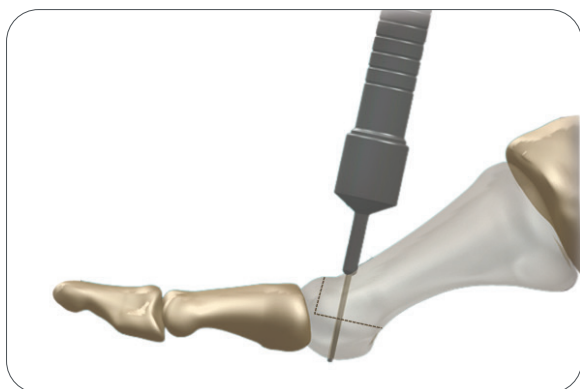


Figure 1-3

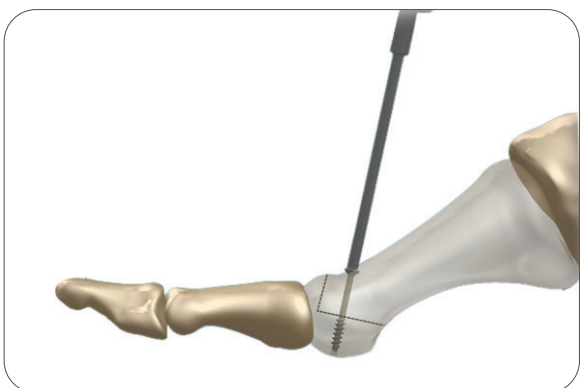


Figure 1-4

Titanium Solid TS - Series

The TS-Series implant offers the latest advances in solid screw design. The low profile TS-Series implant features a solid core shaft coupled with a self-tapping, aggressive hybrid thread design. The TS-Series instruments include manual and power countersinking options. The implants are available in four diameters and various lengths:

Diameters	Lengths
2.0mm	6 - 22mm
2.5mm	8 - 30mm
3.0mm	10 - 40mm
4.0mm	12 - 50mm

Instrument use guide

1-1 After making the appropriate bone cuts, use the properly sized drill bit to create a pilot hole for the entire length of the screw.

1-2 Using a reciprocating motion with the countersink instrument, shape the proximal cortex to the desired depth.

1-3 Slide the depth gauge probe into the pilot hole, and engage the opposite cortex to measure for the correct screw length.

1-4 Drive the screw until the desired level of compression is achieved. Temporary clamping or manual compression of the bone segments can provide more accurate measurement and improve screw engagement into the far side of the osteotomy site. If unusual resistance is experienced, do not attempt to drive the screw.



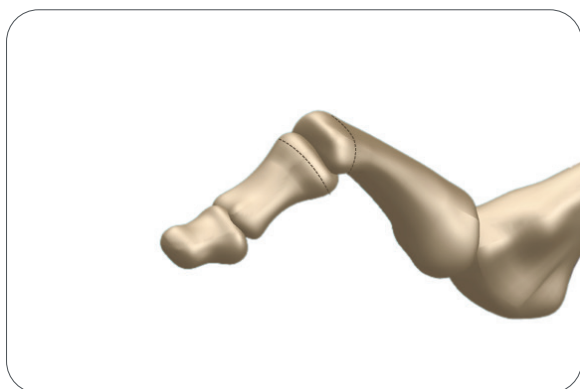


Figure 1-1



Figure 1-2

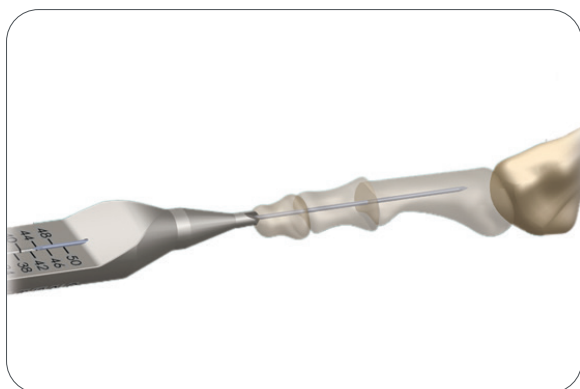


Figure 1-3



Figure 1-4

Digital Fusion DS - Series

The DS-Series implant is designed to feature low profile heads help to minimise soft tissue irritation and can easily be countersunk to sit flush with the tip of the distal phalanx. The precision fit of the driver tip/screw head interface provides a secure connection during screw insertion or removal. The implants are available in various lengths necessary to perform total digital fusions:

Diameters

2.0mm

Lengths

24-50mm

Instrument use guide

1-1 Perform an incision of the surgeon's choice over the proximal interphalangeal (PIP) joint. Resect the base of the middle phalanx and head of the proximal phalanx to the desired length. Optional resection of the distal interphalangeal (DIP) joint can also be performed at this time.

1-2 Drive the guide wire through the center of the middle and distal phalanx and out through the tip of the toe. Retrograde the wire proximal until it is protruding 2 to 4mm from the resected base of the middle phalanx.

1-3 Position the toe into the preferred anatomical alignment, and drive the wire into the center of the proximal phalanx to the depth of the intended screw location, using image intensification, if necessary. Place a small transverse incision in the tip of the toe, and dissect any soft tissue around the distal tuft. Place the countersink/depth gauge over the wire, and lightly countersink the tip of the distal phalanx.

1-4 Slide the screw over the wire and drive into position, compressing the PIP joint. In most cases, two finger tightening is adequate. If unusual resistance or jamming of the screw occurs, do not continue to advance the screw. Check and reposition the K-wire so that it is centered in the medullary canal and not engaging the cortical wall. If unusual resistance is still experienced, do not attempt to drive the screw.



Base Instruments

Reference	Description
FS1005	Titanium Driver Handle
FS1006	Silicone Ratchet Driver Handle
FS1010	Bone Reduction Forceps Sweetheart
FS1012	Bone Reduction Forceps Serrated
FS1014	Bone Reduction Forceps Scarf
FS1030	Screw Pickup Forceps
FS1040	Screw Removal Tool
TT1000	Base Sterilization Tray

Instruments / Guide Wires

Reference	Description
FS3010	TC-Series Cannulated Driver Shaft 2.0/2.5
FS3020	TC-Series Cannulated Driver Shaft 3.0/4.0
FS3030	TC-Series Countersink/Depth Gauge 2.0/2.5
FS3040	TC-Series Countersink/Depth Gauge 3.0/4.0
FS2175	TC-Series Cannulated Countersink 2.0/2.5mm - AO
FS2185	TC-Series Cannulated Countersink 3.0/4.0mm - AO
FS3042	TC-Series Cannulated Over Drill 2.0/2.5
FS3050	TC-Series Cannulated Over Drill 3.0/4.0
KW1102	TC-Series Kwire 2.0/2.5 (0.9 x 100mm)
KW1103	TC-Series Kwire 3.0/4.0 (1.1 x 120mm)
KW1104	TC-Series Threaded Kwire 3.0/4.0 (1.1 x 20mm)
TT3000	TC-Series Cannulated Sterilization Tray
FS2001	TS-Series 2.0 Drill Bit
FS2002	TS-Series 2.5 Drill Bit
FS2003	TS-Series 3.0 Drill Bit
FS2004	TS-Series 4.0 Drill Bit
FS2010	TS-Series Driver Shaft 2.0/2.5mm
FS2020	TS-Series Driver Shaft 3.0/4.0mm
FS2030	TS-Series Depth Gauge 2.0/2.5mm
FS2040	TS-Series Depth Gauge 3.0/4.0mm
FS2050	TS-Series Drill Guide 2.0/2.5mm

Implant Reference No. Naming Reference XX-YYZZ

XX = Screw Type

YY = Screw Diameter

ZZ = Screw Length

TC = Cannulated

TS = Solid

TH = Headless

TQ = QuickSnap

DS = Digital

Instruments / Guide Wires

Reference	Description
FS3010	TC-Series Cannulated Driver Shaft 2.0/2.5
FS3020	TC-Series Cannulated Driver Shaft 3.0/4.0
FS3030	TC-Series Countersink/Depth Gauge 2.0/2.5
FS3040	TC-Series Countersink/Depth Gauge 3.0/4.0
FS2175	TC-Series Cannulated Countersink 2.0/2.5mm - AO
FS2185	TC-Series Cannulated Countersink 3.0/4.0mm - AO
FS3042	TC-Series Cannulated Over Drill 2.0/2.5
FS3050	TC-Series Cannulated Over Drill 3.0/4.0
KW1102	TC-Series Kwire 2.0/2.5 (0.9 x 100mm)
KW1103	TC-Series Kwire 3.0/4.0 (1.1 x 120mm)
KW1104	TC-Series Threaded Kwire 3.0/4.0 (1.1 x 120mm)
TT3000	TC-Series Cannulated Sterilization Tray
FS2001	TS-Series 2.0 Drill Bit
FS2002	TS-Series 2.5 Drill Bit
FS2003	TS-Series 3.0 Drill Bit
FS2004	TS-Series 4.0 Drill Bit
FS2010	TS-Series Driver Shaft 2.0/2.5mm
FS2020	TS-Series Driver Shaft 3.0/4.0mm
FS2030	TS-Series Depth Gauge 2.0/2.5mm
FS2040	TS-Series Depth Gauge 3.0/4.0mm
FS2050	TS-Series Drill Guide 2.0/2.5mm
FS2060	TS-Series Drill Guide 3.0/4.0mm
FS2070	TS-Series Countersink 2.0/2.5mm
FS2080	TS-Series Countersink 3.0/4.0mm
FS2075	TS-Series Countersink 2.0/2.5mm - AO
FS2085	TS-Series Countersink 3.0/4.0mm - AO
TT2000	TS-Series Sterilization Tray
FS4010	TH-Series Cannulated Driver Shaft
FS4020	TH-Series Cannulated Depth Gauge
FS4030	TH-Series Cannulated Relief Drill
FS4040	TH-Series Removal Driver Shaft
FS5010	TQ-Series 3 Prong Driver Shaft
KW1105	TH-Series Kwire (0.80 x 70mm)
TT4000	TH/TQ-Series Sterilization Tray
DS1007	DS-Series Ratchet Driver Handle
DS1008	DS-Series Countersink Depth Gauge
DS3010	DS-Series Driver Shaft
DW1111	DS-Series Dbl Pointed Kwire (0.82x90mm)
TT5000	DS-Series Sterilization Tray

TC Series - Cannulated Screws

Reference	Size
TC2006	2.0mm
TC2008	2.0mm
TC2010	2.0mm
TC2012	2.0mm
TC2014	2.0mm
TC2016	2.0mm
TC2018	2.0mm
TC2020	2.0mm
TC2022	2.0mm
TC2508	2.5mm
TC2510	2.5mm
TC2512	2.5mm
TC2514	2.5mm
TC2516	2.5mm
TC2518	2.5mm
TC2520	2.5mm
TC2522	2.5mm
TC2524	2.5mm
TC2526	2.5mm
TC2528	2.5mm
TC2530	2.5mm
TC3010	3.0mm
TC3012	3.0mm
TC3014	3.0mm
TC3016	3.0mm
TC3018	3.0mm
TC3020	3.0mm
TC3022	3.0mm
TC3024	3.0mm
TC3026	3.0mm
TC3028	3.0mm
TC3030	3.0mm
TC3032	3.0mm
TC3034	3.0mm
TC3036	3.0mm
TC3040	3.0mm
TC4012	4.0mm
TC4014	4.0mm
TC4016	4.0mm
TC4018	4.0mm
TC4020	4.0mm
TC4022	4.0mm
TC4024	4.0mm
TC4026	4.0mm
TC4028	4.0mm

Reference	Size
TC4030	4.0mm
TC4032	4.0mm
TC4034	4.0mm
TC4036	4.0mm
TC4038	4.0mm
TC4040	4.0mm
TC4042	4.0mm
TC4046	4.0mm
TC4050	4.0mm

TS Series - Solid Screws

Reference	Size
TS2006	2.0mm
TS2008	2.0mm
TS2010	2.0mm
TS2012	2.0mm
TS2014	2.0mm
TS2016	2.0mm
TS2018	2.0mm
TS2020	2.0mm
TS2022	2.0mm
TS2508	2.5mm
TS2510	2.5mm
TS2512	2.5mm
TS2514	2.5mm
TS2516	2.5mm
TS2518	2.5mm
TS2520	2.5mm
TS2522	2.5mm
TS2524	2.5mm
TS2526	2.5mm
TS2528	2.5mm
TS2530	2.5mm
TS3010	3.0mm
TS3012	3.0mm
TS3014	3.0mm
TS3016	3.0mm
TS3018	3.0mm
TS3020	3.0mm
TS3022	3.0mm
TS3024	3.0mm
TS3026	3.0mm
TS3028	3.0mm
TS3030	3.0mm
TS3032	3.0mm
TS3034	3.0mm
TS3036	3.0mm
TS3038	3.0mm

Reference	Size
TS3040	3.0mm
TS4012	4.0mm
TS4014	4.0mm
TS4016	4.0mm
TS4018	4.0mm
TS4020	4.0mm
TS4022	4.0mm
TS4024	4.0mm
TS4026	4.0mm
TS4028	4.0mm
TS4030	4.0mm
TS4032	4.0mm
TS4034	4.0mm
TS4036	4.0mm
TS4038	4.0mm
TS4040	4.0mm
TS4042	4.0mm
TS4046	4.0mm
TS4050	4.0mm

TH Series - Headless Screws

Reference	Size
TH2510	2.5mm
TH2512	2.5mm
TH2514	2.5mm
TH2516	2.5mm
TH2518	2.5mm
TH2520	2.5mm
TH2522	2.5mm
TH3014	3.0mm
TH3016	3.0mm
TH3018	3.0mm
TH3020	3.0mm
TH3022	3.0mm
TH3024	3.0mm
TH3026	3.0mm
TH3028	3.0mm
TH3030	3.0mm
TH3032	3.0mm
TH3034	3.0mm

TQ Series - Quick Snap Screws

Reference	Size
TQ2008	2.0mm
TQ2010	2.0mm
TQ2011	2.0mm
TQ2012	2.0mm
TQ2014	2.0mm
TQ2016	2.0mm
TQ2712	2.7mm
TQ2714	2.7mm
TQ2716	2.7mm
TQ2718	2.7mm
TQ2720	2.7mm
TQ2722	2.7mm

DS Series - Digital Fusion Screws

Reference	Size
DS2024	2.0mm
DS2026	2.0mm
DS2028	2.0mm
DS2030	2.0mm
DS2032	2.0mm
DS2034	2.0mm
DS2036	2.0mm
DS2038	2.0mm
DS2040	2.0mm
DS2042	2.0mm
DS2044	2.0mm
DS2046	2.0mm
DS2048	2.0mm
DS2050	2.0mm

**Surgical Technique**

Smith+Nephew does not provide medical advice and does not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any implant procedure is responsible for determining and using the appropriate techniques for implanting the device in each patient.

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