

Humeral Nail

Surgical Technique

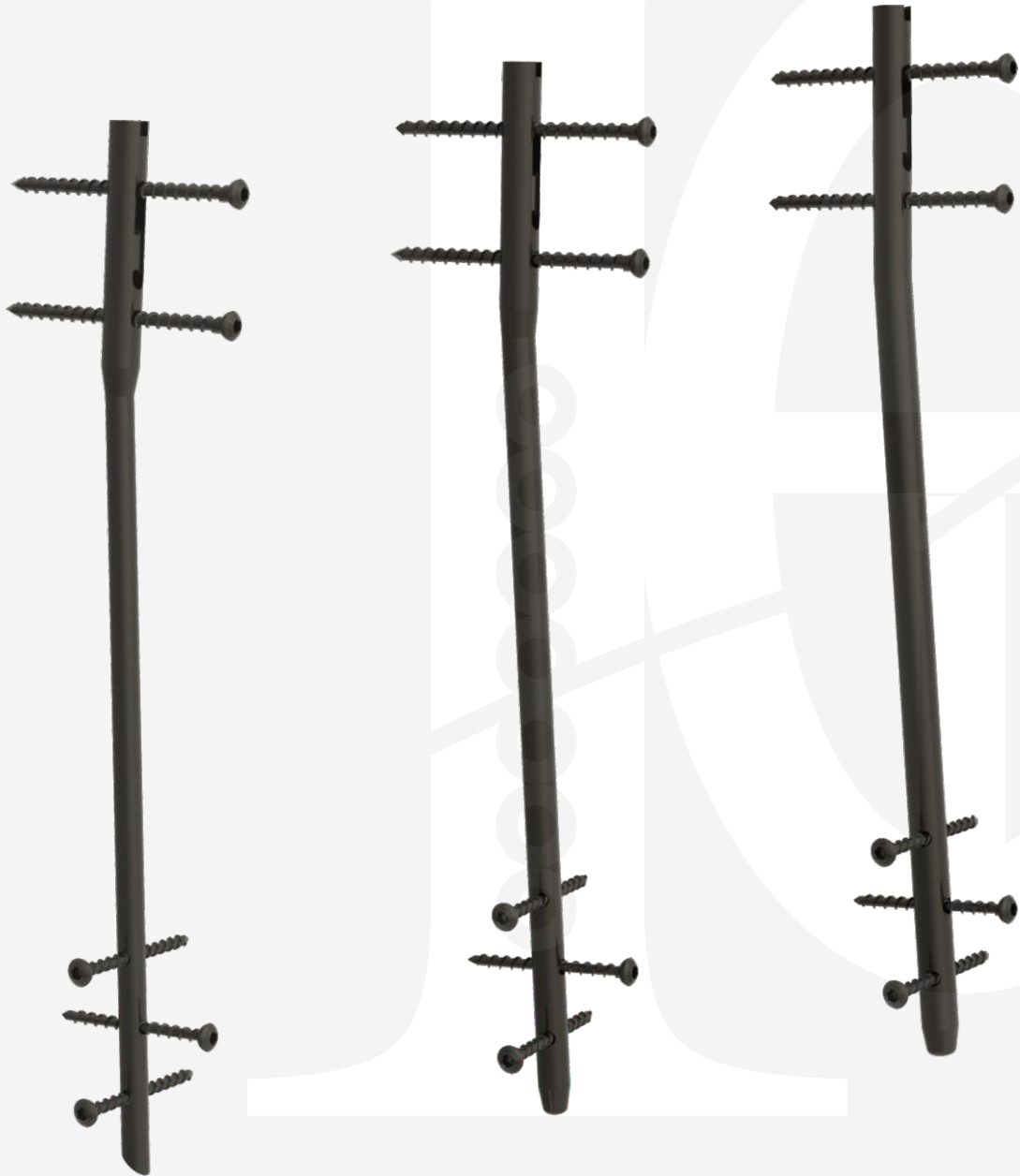


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The Humeral Nail is indicated for:

- ◆ Fractures of the proximal humerus including
- ◆ 2-part surgical neck fractures
- ◆ 3-part fracture
- ◆ 4-part fractures
- ◆ Fractures of the proximal humerus with diaphyseal Extension
- ◆ Diaphyseal fractures of the humeral shaft
- ◆ Impending pathological fractures



1. Position Approach

Place the patient on a radiolucent table in the position of a beach chair. Placing the fractured arm on an adjustable side table or arm rest while supporting the shoulder with pads is a good idea. To expose the humeral head anterior to the acromion, make sure the arm may be properly retracted.

Make sure the C-arm is positioned so that the complete humerus can be seen in two planes, such as at the patient's head or the other side from the wounded arm.

It is also possible to employ a modified supine position on a totally radiolucent table. Place the C-arm so that the entire humerus may be seen in the AP and lateral planes. In the AP view, place the C-arm across from the surgeon at a right angle to the longitudinal axis of the humeral shaft.

Obtain a scapular "Y" lateral view by bringing the C-arm through a 90° arc and projecting the beam directly at the glenoid.

2. Approach

Use an anterolateral approach. Begin the incision at the anterolateral acromion and work your way distally over the deltoid muscle. Retract the deltoid muscle at the tendinous juncture between the anterior and middle thirds of its fibers. A better view can be obtained in complex fractures by partially separating the deltoid muscle from the anterior border of the acromion.

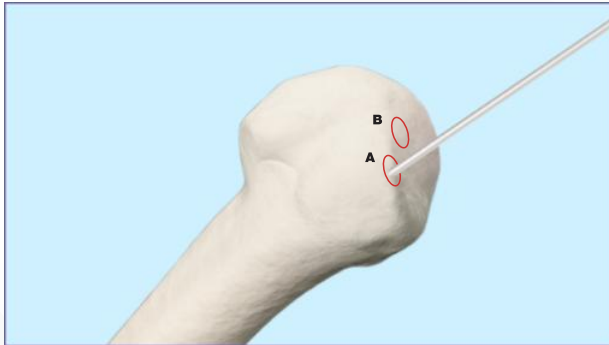
Note:

To avoid iatrogenic axillary nerve damage, do not prolong the approach too far distally. Gentle palpation or precise dissection might be used to locate the nerve. To prevent additional incisional extension, a stay suture may be applied.

3. Reduce Fracture

Use Guide wires to temporarily hold the fragments in place during implant insertion. Check that the Guide wires do not interfere with nail implantation.

Examine the reduction option under image intensification.

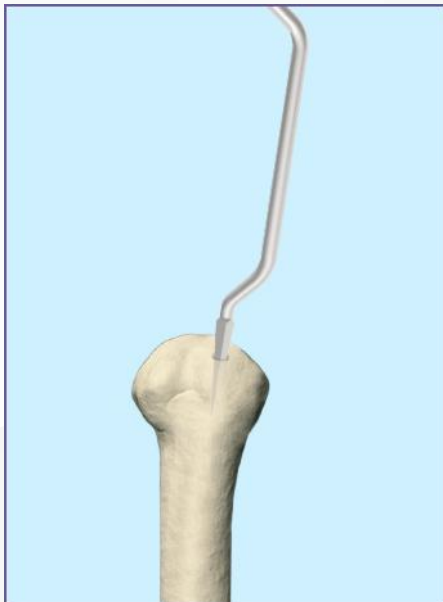


4. Determine the Entry point

In both AP and lateral views, the optimal entry location is near the apex of the humeral head, in line with the medullary canal. This point is placed between the greater tuberosity and the humeral head, posterolateral to the biceps tendon and medial to the sulcus.

Note:

If the acromion prevents access to the optimal entry location, shift the apex of the humeral head in front of the acromion by extending the shoulder.

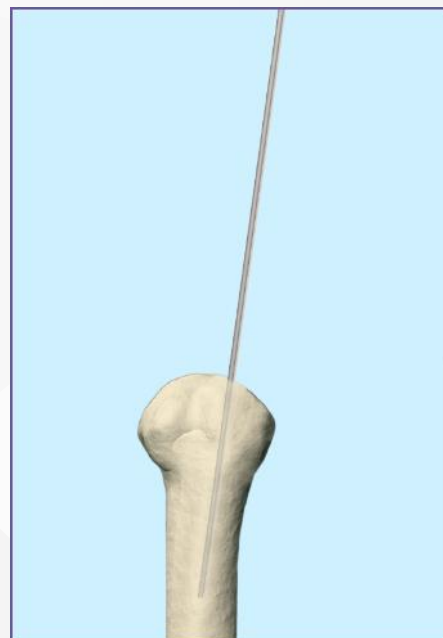


5. Insert Guide wire

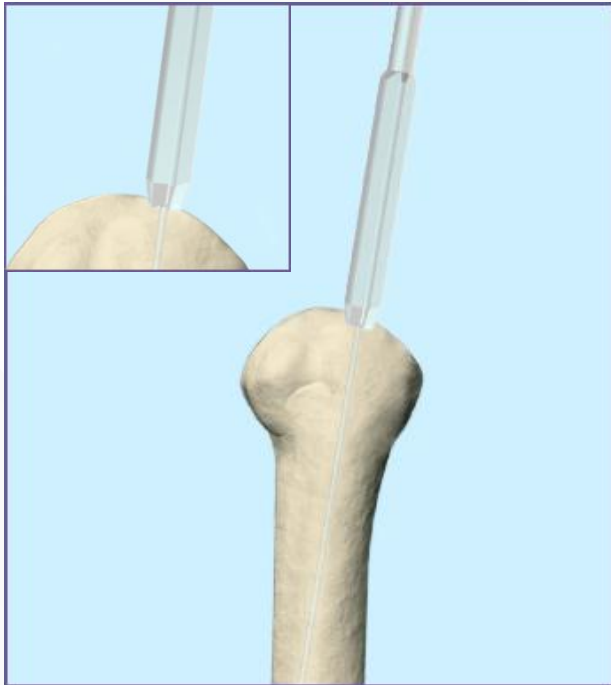
Instruments

- 803.006 Small Bone Awl Diamond Pointed
- 809.008 Guide Wire 1.8mm Length 750mm

Insert a 1.8 mm Guide wire for accessing the medullary canal.



Remove the awl and Insert Guide wire.



6. Open Medullary Canal

Instruments

809.005 Starting Reamer for Humeral Nail with Q/C 8.0mm

726.070 Reamer For Nail 7.0mm

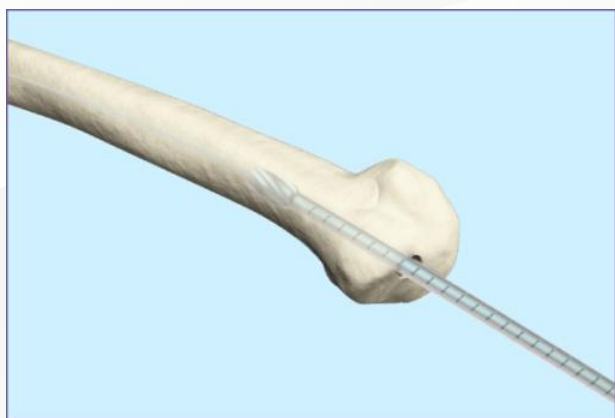
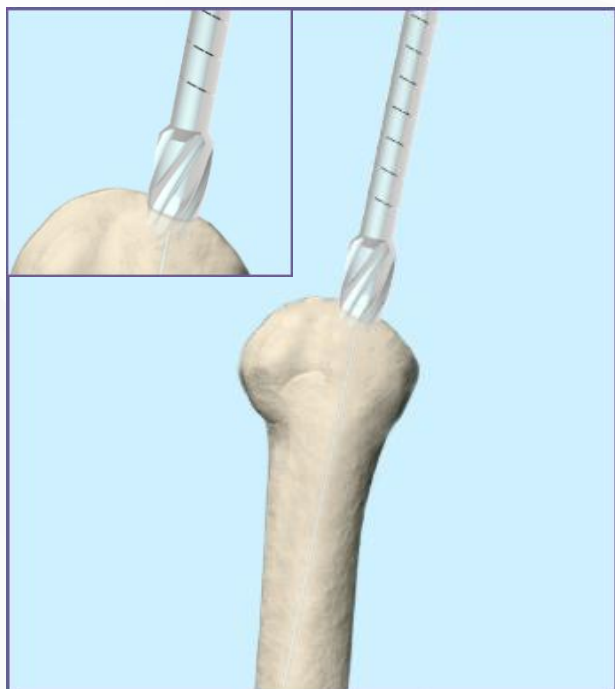
Optional

809.009 Starting Reamer for Humeral Nail Fix T-Handle 8.0mm

Pass the awl to the bone over the Guide wire. Advance the awl to the depth of the medullary canal with a twisting motion.

Note:

Take care not to move the fracture when utilizing the cannulated awl, especially in complex fracture cases.



7. Reaming Guidelines

Check that fracture reduction has been maintained using image intensification.

According to the surgeon's desire, ream to a diameter at least 1.0 mm larger than the nail diameter. Ream in 0.5 mm increments while applying constant, moderate pressure to the reamer.

Precaution:

Do not overwork the reamer. Retract the reamer slightly on a regular basis to eliminate debris from the medullary canal.

If there is comminution in the area where the radial nerve touches the bone in the radial sulcus, reaming should be avoided.

Note:

After reaming, flush the surgical site to eliminate any leftover debris and reduce the possibility of heterotopic ossification.



1. Assemble Insertion Assembly

Instruments

809.001 Proximal Gig for Humeral

809.002 Threaded Conical bolt for Humeral Nail

Orient the insertion handle laterally and match the insertion handle geometry to the nail. Insert the Conical Bolt into the nail through the insertion handle. With the combination wrench, tighten the assembly.



2. Insert Nail

Instruments

804.007 Extractor-Impactor Rod with Hammer
(Set of Two)

Using twisting motions, insert and advance the nail into the medullary canal. Laterally orient the insertion handle.

To avoid misalignment, monitor the nail progress through the crack and manage it in two planes.

Advance the nail to the fracture site, decrease the fracture, and proceed into the diaphysis in the case of a metaphyseal fracture.

Examine the nail location in both the AP and lateral views.

Precaution:

To avoid impingement, the proximal end of the nail must be put below the humeral head surface. Use of a hammer may raise the risk of iatrogenic fractures.

Note:

Choose a smaller diameter nail or ream the intramedullary canal to a bigger diameter if nail insertion is difficult.

When advancing the nail, apply pressure on the elbow to avoid distraction and potential healing issues.

1. Position nail: Insertion depth

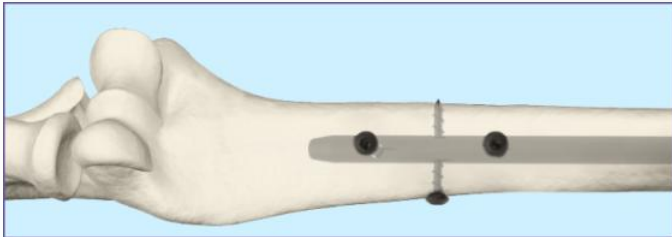
To reduce the possibility of impingement while maximizing stability, the proximal nail end should be at least 2 to 3 mm below the cartilage. This determines the implant's implantation depth.

Examine the proximal nail position clinically and by imaging.

2. Locking distal first if Compression is need

First Remove the Guide wire.

Locking distal hole with help of image intensifier.





1. Drill and Determine the screw length

Instruments

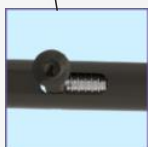
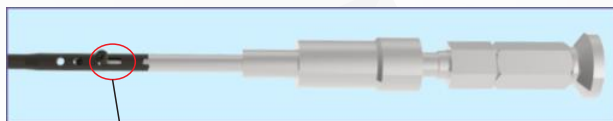
- 809C.003 Protection Sleeve 10.0/8.0mm for Humeral
- 809C.004 Pointer 8.0mm for Humeral
- 809C.007 Drill Sleeve 8.0/2.5mm for Humeral
- 602.008 Drill Bits 2.7mm x 180mm for Jacobs Chuck
- 804E.008 Depth Gauge for Humeral

Insert the calibrated drill bit and slowly drill until the subchondral bone level is achieved. Use the image intensifier to confirm drill bit position.

Remove the drill bit and keep outer sleeve in position.

Insert the depth gauge through the protective sleeve and advance it until subchondral space resistance is felt. Under imaging, keep an eye on the monitor. To guarantee accurate measurement, press the outside part of the depth gauge firmly against the cortex.

Directly measure the screw length from the depth gauge at the back of the outer sleeve.



2. Insert the screw

Instruments

- 809C.003 Protection Sleeve 10.0/8.0mm for Humeral
- 804.009 Hexagonal Screw Driver 2.5mm Tip Long for 3.9mm Bolt
- 809.003 Sleeve For Compression Device
- 809.004 Compression Device

Assemble the screwdriver shaft and handle.

Insert the appropriate length screw through the sleeve. Tighten the screw until you hear a click.

Distal is locking with the help of compression sleeve and compression device, approximately 5mm of compression can be achieved.



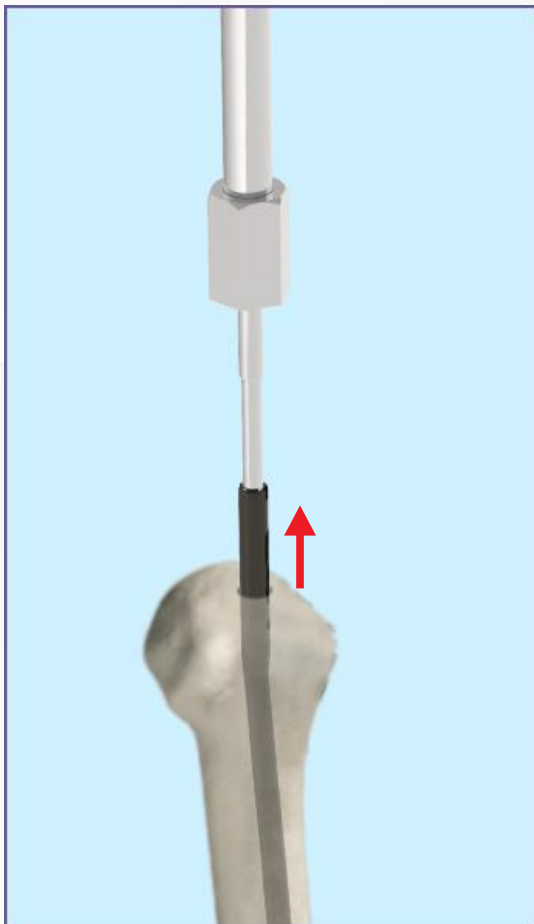
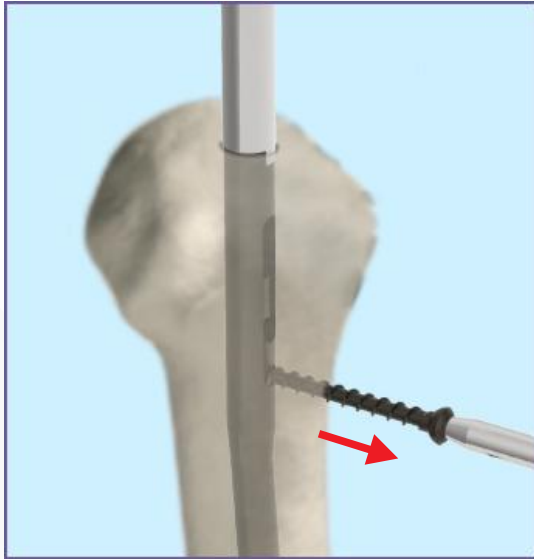


3. Insert end cap

Instruments

804.009 Hexagonal Screw Driver 2.5mm Tip
Long for 3.9mm Bolt

Remove nail insertion instruments.
With the help of screw driver insert the end cap.



Instrument

- 804.009 Hexagonal Screw Driver 2.5mm Tip Long for 3.9mm Bolt
- 809.010 Head For Threaded Conical bolt for Humeral Long for 4.9mm Bolt
- 804.007 Extractor-Impactor Rod with Hammer (Set of Two)

The removal of implants is an optional procedures.

Remove all Screw from the nail.

Insert nail Extractor attachment and connect hammer guide and remove the nail.



Humeral Nail for Stainless Steel

6mm Dia. Code No.	7mm Dia. Code No.	8mm Dia. Code No.	Length (mm)
363A.18	363B.18	363C.18	180
363A.20	363B.20	363C.20	200
363A.22	363B.22	363C.22	220
363A.24	363B.24	363C.24	240
363A.26	363B.26	363C.26	260
363A.28	363B.28	363C.28	280
363A.30	363B.30	363C.30	300

Humeral Nail for Titanium

6mm Dia. Code No.	7mm Dia. Code No.	8mm Dia. Code No.	Length (mm)
T363A.18	T363B.18	T363C.18	180
T363A.20	T363B.20	T363C.20	200
T363A.22	T363B.22	T363C.22	220
T363A.24	T363B.24	T363C.24	240
T363A.26	T363B.26	T363C.26	260
T363A.28	T363B.28	T363C.28	280
T363A.30	T363B.30	T363C.30	300



2.9mm Interlocking Bolt

SS Code No.	Titanium Code No.	Length (mm)
350.20	T350.20	20
350.22	T350.22	22
350.24	T350.24	24
350.26	T350.26	26
350.28	T350.28	28
350.30	T350.30	30
350.32	T350.32	32
350.34	T350.34	34
350.36	T350.36	36
350.38	T350.38	38
350.40	T350.40	40



3.4mm Interlocking Bolt

SS Code No.	Titanium Code No.	Length (mm)
351.16	T351.16	16
351.18	T351.18	18
351.20	T351.20	20
351.22	T351.22	22
351.24	T351.24	24
351.26	T351.26	26
351.28	T351.28	28
351.30	T351.30	30
351.32	T351.32	32
351.34	T351.34	34
351.36	T351.36	36
351.38	T351.38	38
351.40	T351.40	40
351.45	T351.45	45
351.50	T351.50	50

End Cap for Humeral Nail

SS Code No.	Titanium Code No.
355.05	T355.05



809.001 Proximal Gig for Humeral



809.002 Threaded Conical bolt for Humeral Nail



809.003 Sleeve For Compression Device



809.004 Compression Device



809.005 Starting Reamer for Humeral Nail with Q/C 8.0mm



809C.003 Protection Sleeve 10.0/8.0mm for Humeral



809C.004 Pointer 8.0mm for Humeral



809C.006 Drill Sleeve 8.0/2.7mm for Humeral

809C.007 Drill Sleeve 8.0/2.5mm for Humeral



804.007 Extractor-Impactor Rod with Hammer (Set of Two)



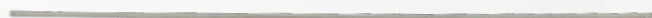
804E.008 Depth Gauge for Humeral



809.009 Hexagonal Screw Driver 2.5mm Tip Long for 3.9mm Bolt



809.008 Guide Wire 1.8mm Length 750mm

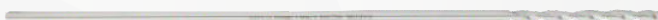


803.006 Small Bone Awl Diamond Pointed

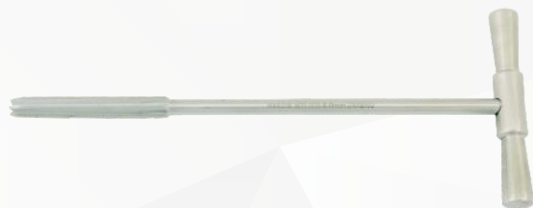


602.006 Drill Bits 2.5mm x 180mm for Jacobs Chuck

602.008 Drill Bits 2.7mm x 180mm for Jacobs Chuck



809.009 Starting Reamer for Humeral Nail Fix T-Handle 8.0mm



809.010 Head For Threaded Conical bolt for Humeral



895.019 Spanner 19mm



AGC.09 Humeral Nail Instrument and Implant Set

Instruments

809.001	Proximal Gig for Humeral
809.002	Threaded Conical bolt for Humeral Nail
809.003	Sleeve For Compression Device
809.004	Compression Device
809.005	Starting Reamer for Humeral Nail with Q/C 8.0mm
809C.003	Protection Sleeve 10.0/8.0mm for Humeral
809C.004	Pointer 8.0mm for Humeral
809C.006	Drill Sleeve 8.0/2.7mm for Humeral
809C.007	Drill Sleeve 8.0/2.5mm for Humeral
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809.010	Head For Threaded Conical bolt for Humeral
895.019	Spanner 19mm

Implants

363A	Humeral Nail 6.0mm x 180mm, 200mm, 220mm, 240mm, 260mm, 280mm, 300mm
363B	Humeral Nail 7.0mm x 180mm, 200mm, 220mm, 240mm, 260mm, 280mm, 300mm
363C	Humeral Nail 8.0mm x 180mm, 200mm, 220mm, 240mm, 260mm, 280mm, 300mm
350	2.9mm Interlocking Bolt Length : 20mm, 22mm, 24mm, 26mm, 28mm, 30mm, 32mm, 34mm, 36mm, 38mm, 40mm
351	3.4mm Interlocking Bolt Length : 16mm, 18mm, 20mm, 22mm, 24mm, 26mm, 28mm, 30mm, 32mm, 34mm, 36mm, 38mm, 40mm, 45mm, 50mm





House of Ortho Tools

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