

# X-Bolt Hip Plating System (XHS™)

**X-Bolt**  
Trauma Orthopedics

## Surgical Technique



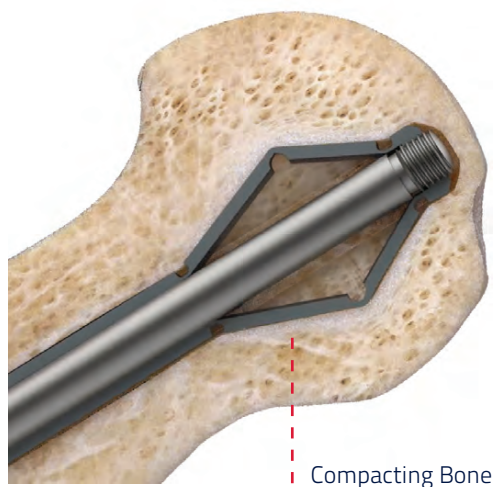


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## Design Features



### **LC-XHS™ PLATE, EXPANDING BOLT AND CORTICAL SCREWS**

- > Manufactured in 316LVM stainless steel
- > Sterile packaged

### **X-BOLT® (EXPANDING BOLT)**

- > 8.0mm shaft diameter
- > 20.0mm maximum expandable span
- > 10 length options: 80mm to 125mm

### **LC-XHS™ PLATE**

- > Low-contact dynamic barrel plate
- > 130° neck-shaft angle
- > Generic-sized dynamic hip screw plate
- > Optional lengths and short barrel option

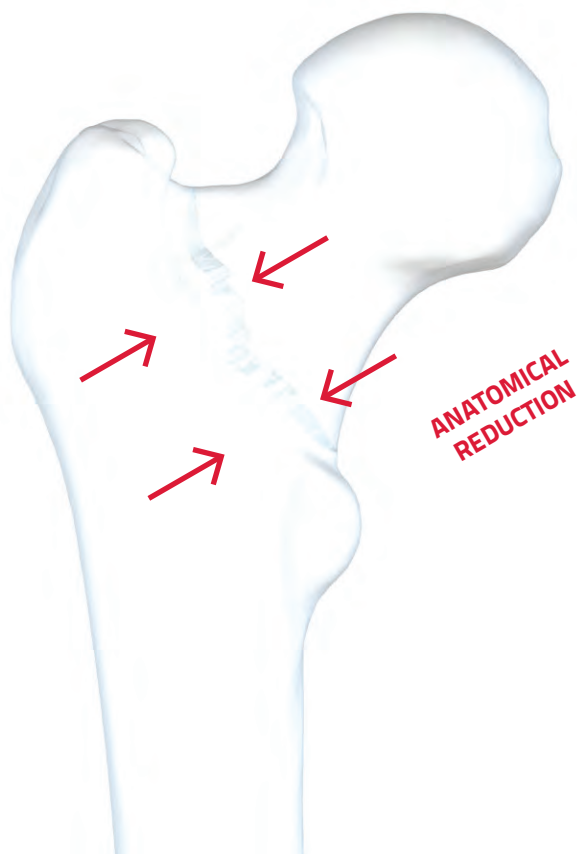
### **CORTICAL SCREWS**

- > 4.5mm diameter self-tapping
- > 30mm to 44mm in 2mm increments

### **HOW AN X-BOLT® WORKS**

- > Drive screw with opposing threads
- > Actuated with screwdriver
- > In-situ deployment of four wings
- > Compacts surrounding cancellous bone
- > Tip-apex point preserved
- > No spinning of femoral head
- > Easily reversible

# 1 > Set-Up



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## INSTRUMENTS USED:

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## SET-UP

Standard set-up using a fracture table and traction.

Anatomical reduction is key to successful outcome.

Follow all steps on fluoroscopy.

Standard lateral approach to lateral femur.

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# 2 Femoral Head K-Wire



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## INSTRUMENTS USED:

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- > 130° angle guide
- > 3.2mm K-wire

- > Honeycomb drill guide

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## FEMORAL HEAD K-WIRE

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Using the 130° angle guide, place femoral head guidewire centre-centre to within 5 mm of joint line (optimum tip-apex point). Remove angle guide.

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### Tips

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In unstable fracture patterns, consider placing a 2nd K-wire to skewer and hold the reduced fracture position.

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The honeycomb drill guide can be optionally used to place an angled or parallel K-wire to obtain an optimum position.

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# 3 Measure



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## INSTRUMENTS USED:

> K-wire Ruler

## MEASURE

Measure depth from center of laser mark on guidewire with K-wire ruler.

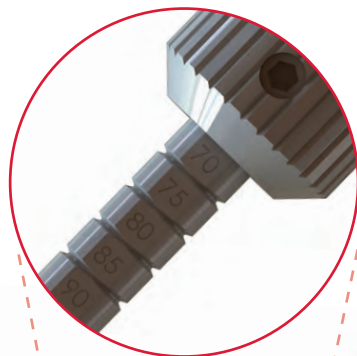
### Focus

Round down to nearest 5mm and also allow for any anticipated post-operative fracture collapse for optimum choice of length for X-Bolt.

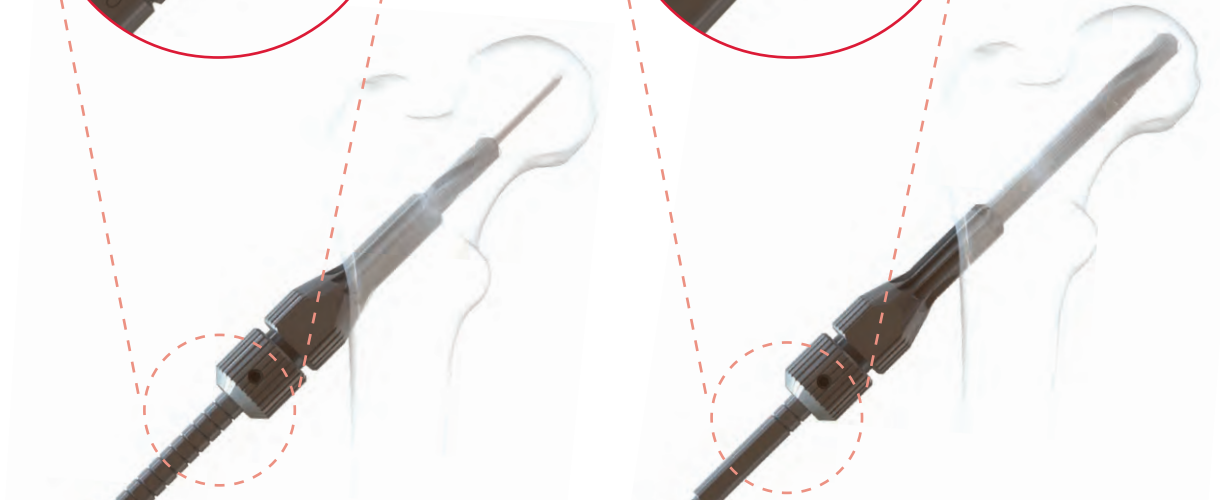
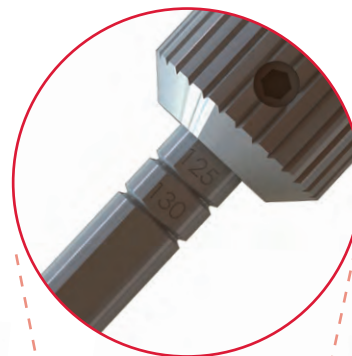
# 4

## Ream

### 1. REAM COUNTERSINK



### 2. REAM TO TIP-APEX



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#### INSTRUMENTS USED:

- > Triple Reamer
- > (Use short barrel component when using short barrel plate)

#### REAM

Start short, then go long. Set triple reamer to a short length (e.g. 70mm). Insert over guidewire and ream barrel channel and counter-sink. Reset reamer to a longer length than X-Bolt measurement (e.g. 125mm) and ream closely under fluoroscopy to ensure reamed to tip-apex point.

#### Optionally

Set reamer to measured X-Bolt length and check closely that both countersink and tip-apex point have been reamed satisfactorily.

- > **Always follow closely on fluoroscopy to ensure that K-wire does not jam and be driven inadvertently into pelvis.**

Remove reamer and primary guidewire.

# 5 > Bone Crusher



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## INSTRUMENTS USED:

> Bone crusher

## BONE CRUSHER

Insert bone crusher to tip-apex point and check on fluoroscopy. Deploy at orthogonal angles to femoral shaft, compacting the cancellous bone to create initial zone for X-Bolt expansion. Avoid rotating the bone crusher when limbs deployed as will rotate femoral head fragment.

### Focus

Bone crusher gives excellent haptic feedback on the quality of the bone.

### Optionally

In strong bone it may be necessary to fan out and repeat deployment at 5-10° in each orthogonal plane.

### Tips

Bone crusher may be used as an aid to fine-tune rotational alignment and reduction.



# 6 > Assemble Implants



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**INSTRUMENTS USED:**

- > T20 Torx Screwdriver
- > Screw Holding Sleeve

**ASSEMBLE IMPLANTS**

On a side table, slide X-Bolt into plate barrel.

Use screwdriver and holding sleeve to hold the construct by inserting into base of X-Bolt; the screw holding sleeve preventing the plate from sliding off.



## Insert X-Bolt and Plate



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### **INSTRUMENTS USED:**

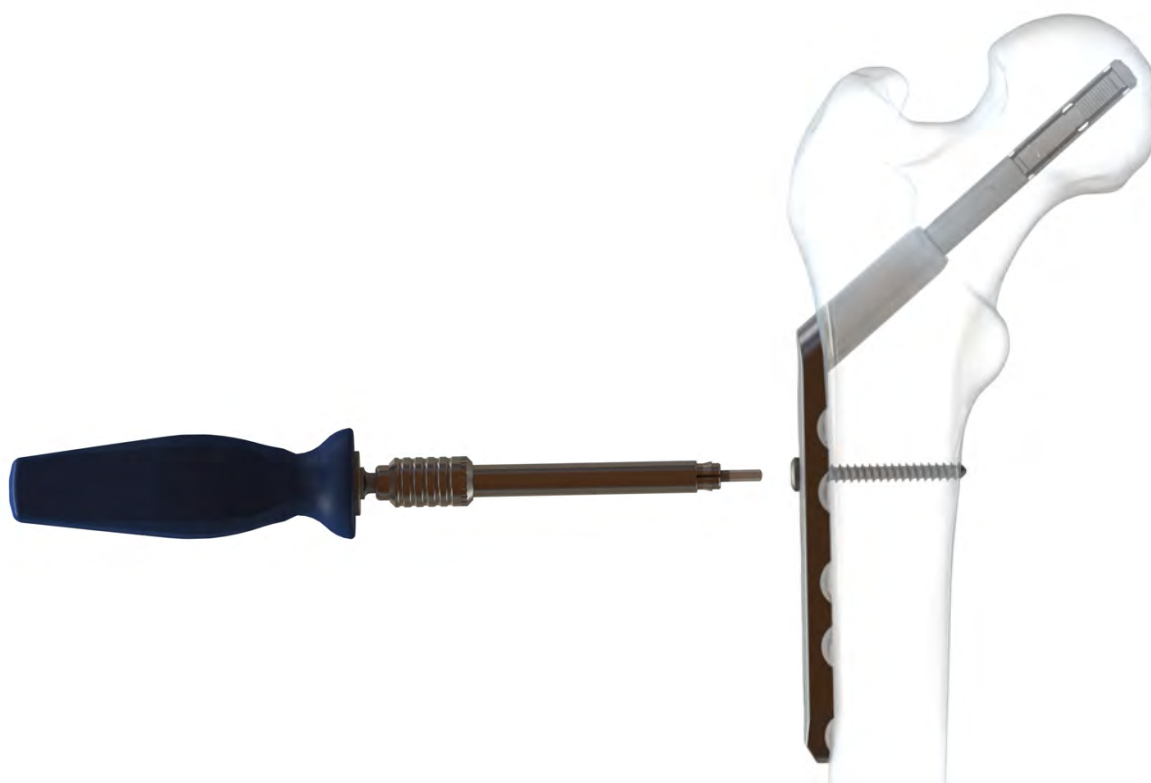
- > T20 Torx Screwdriver
- > Plastic Impactor

### **INSERT X-BOLT AND PLATE**

Insert X-Bolt and plate construct into reamed and prepared channel. Seat plate onto femur using plastic impactor.

Advance the X-Bolt to all the way to tip-apex point using the T20 screwdriver, having removed the screw holding sleeve.

# 8 > Cortical Screws



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## **INSTRUMENTS USED:**

- > 3.2mm Drill Bit
- > Depth Gauge

- > Hex Screwdriver
- > Screw Holding Sleeve

## **CORTICAL SCREWS**

Drill, measure and place one 4.5mm cortical screw through plate using hex screwdriver.  
This fixes plate to femur and counters rotation of when deploying X-Bolt.

# 9 > Expand X-Bolt



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## INSTRUMENTS USED:

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> T20 Torx Screwdriver

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## EXPAND X-BOLT

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Clockwise turns with the T20 screwdriver expand the X-Bolt until the desired expansion, or until a stop is felt, or to the screwdriver torque limit. Do not use excessive force. If inadvertent resistance is felt, remove X-Bolt and repeat bone crusher step.

5

Reversal if necessary is performed by anticlockwise rotation.

6

The X-Bolt must be discarded and replaced if full expansion has been reversed, or has been damaged in any way.

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### Focus

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The torque necessary to expand the X-Bolt gives excellent tactile feedback on the quality of the bone.

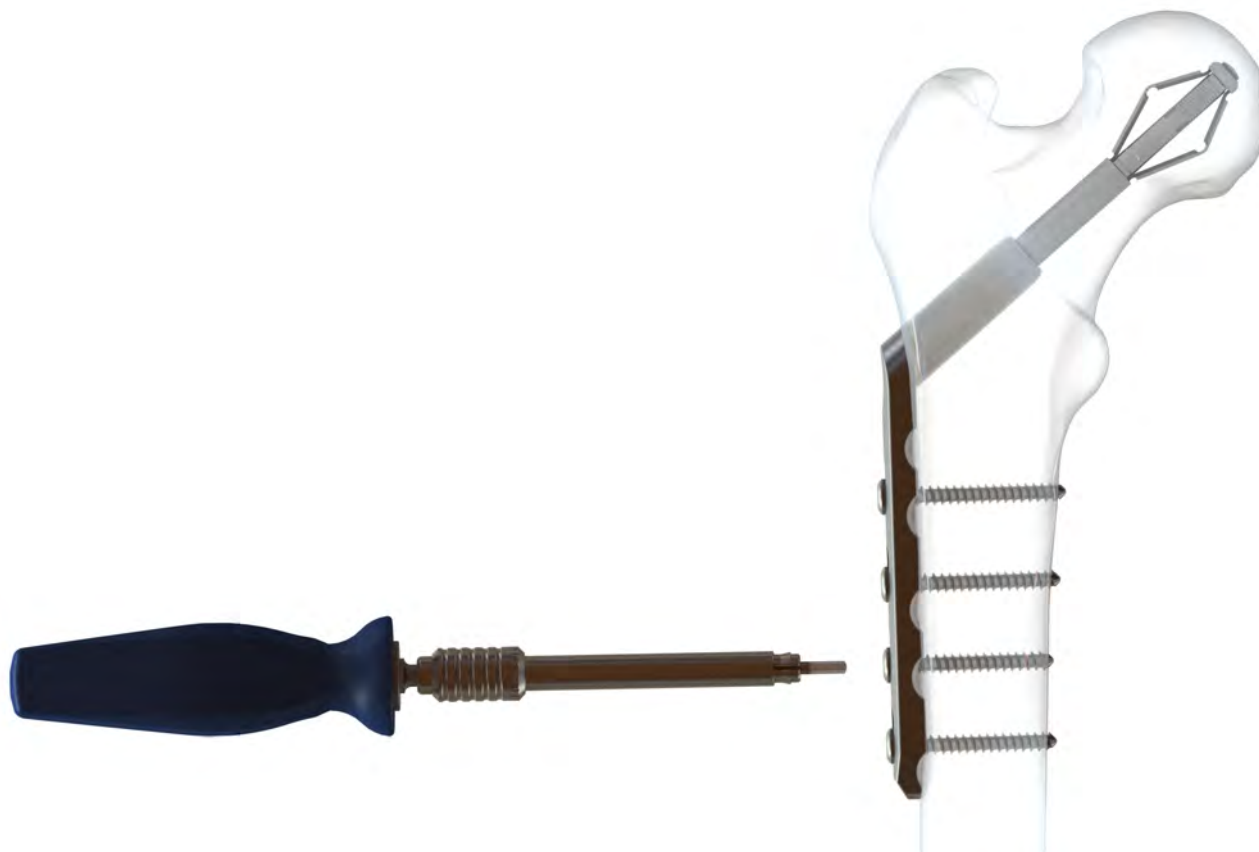
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### Tips

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In strong bone it is acceptable to have partial X-Bolt expansion, at surgeon's discretion.

# 10 > Closure



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## **INSTRUMENTS USED:**

- > 3.2mm Drill Bit
- > Hex Screwdriver
- > Depth Gauge
- > Screw Holding Sleeve

## **CLOSURE**

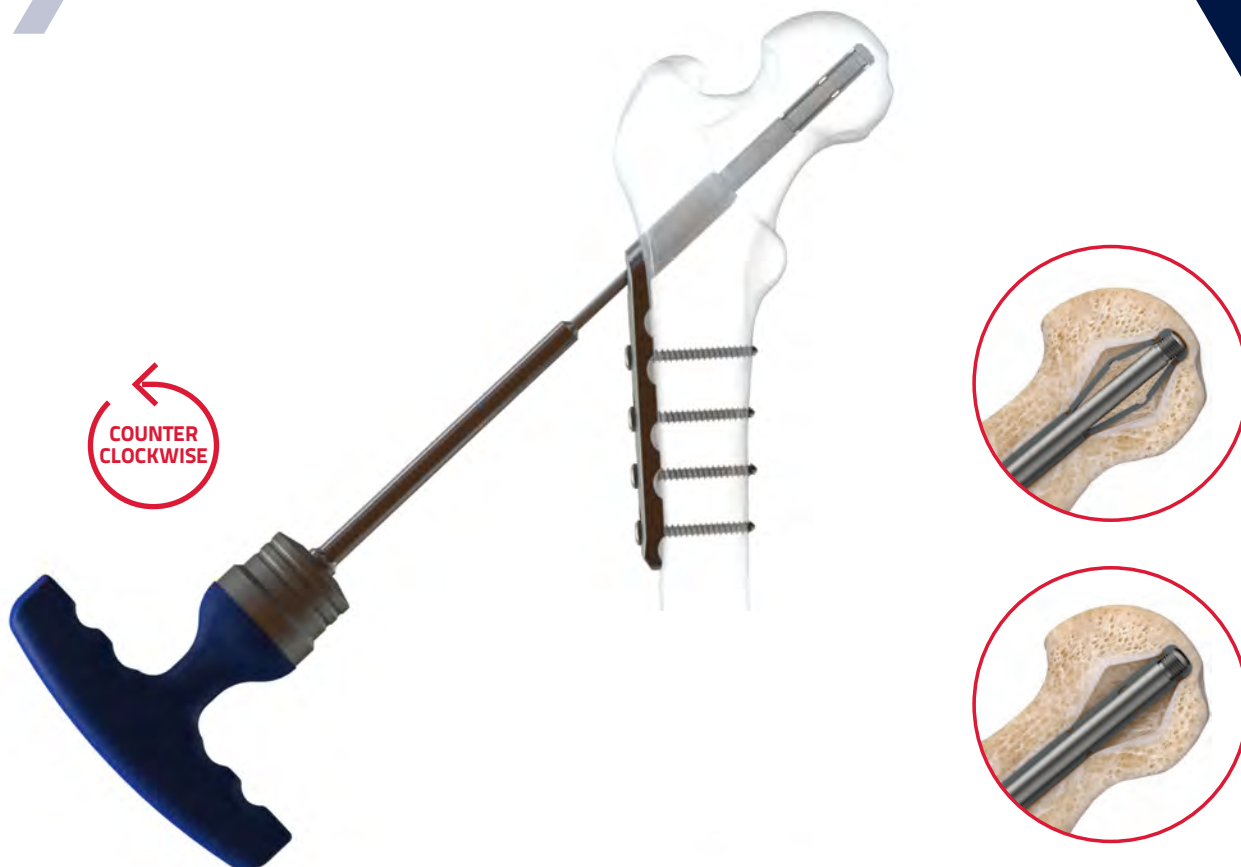
Insert any remaining cortical screws and check final position.

Wound closure in layers, post-operative management and weight-bearing as per surgeon's instructions.

Fracture compression will occur when traction is removed from leg and with later weight-bearing. Optionally, use of the removal rod can facilitate on-table fracture compression.



## Removal



### INSTRUMENTS USED:

- > T20 Torx screwdriver
- > Removal rod
- > 3.5mm hex screwdriver

### 1. REVERSE X-BOLT EXPANSION

Reverse with anticlockwise rotation of T20 screwdriver inserted into base of X-Bolt when still within the plate. The X-Bolt is able to crush new bone formed within expanded wings.

### 2. REMOVE PLATE AND SCREWS

Remove cortical screws and plate when X-Bolt wings fully retracted. Insert removal rod into base of X-Bolt and remove X-Bolt.

### CONVERSION TO HEMI OR THR

In the unlikely event of breakage at the X-Bolt wing hinges during removal, continue anticlockwise turns of the screwdriver. This will disengage the inner drive screw from the apex threads. Insert removal rod into base of X-Bolt and remove X-Bolt shaft and drive screw. Apex fragments may be left in-situ and removed with the femoral head if converting to a hemi or total hip replacement.

### REMOVING APEX FRAGMENTS

If apex fragments are present and need removal, and the femoral head is to be preserved, use an arthroscopy grasper or spinal rongeur to grab and remove metal fragments.



# Instruments



**XNI-010 PLASTIC IMPACTOR**



**XNI-017 REMOVAL ROD**



**XNI-022 SCREWDRIVER, 3.5MM-HEX**



**XNI-024 IN-LINE SCREWDRIVER HANDLE**



**XNI-030 DEPTH GAUGE**



**XNI-031 LAG SCREW TAP**



**XNI-040 BONE CRUSHER**



**XNI-045 SCREWDRIVER, T20 TORX,  
4.5NM TORQUE LIMIT**



**XNI-050 TRIPLE REAMER**



**XNI-055 SHORT BARREL FOR TRIPLE REAMER**



# Instruments



**XNI-060 GREEN AND GOLD DRILL GUIDE**



**XNI-070 SCREW HOLDING SLEEVE**



**XNI-080 K-WIRE RULER**



**XNI-090 POWER DRIVER, 3.5MM-HEX, QUICK COUPLING**

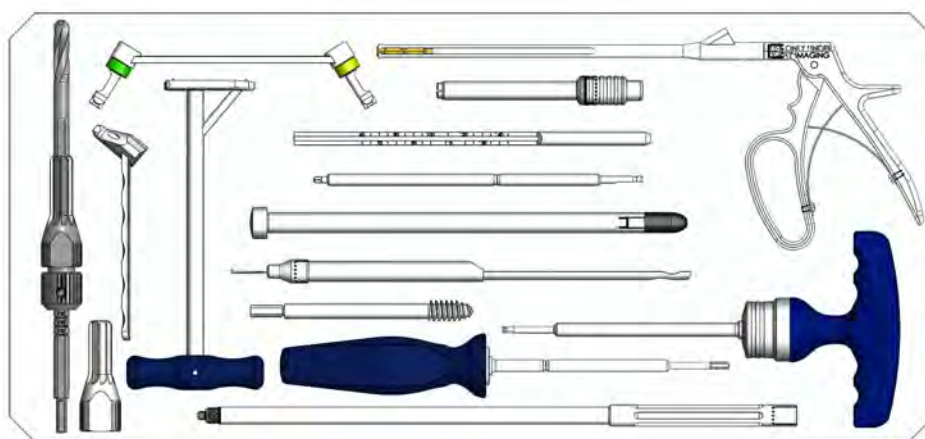


**XNI-110 HONEYCOMB DRILL GUIDE**



**XNI-130 130° DRILL GUIDE**

## XNI-300 SET 'P'

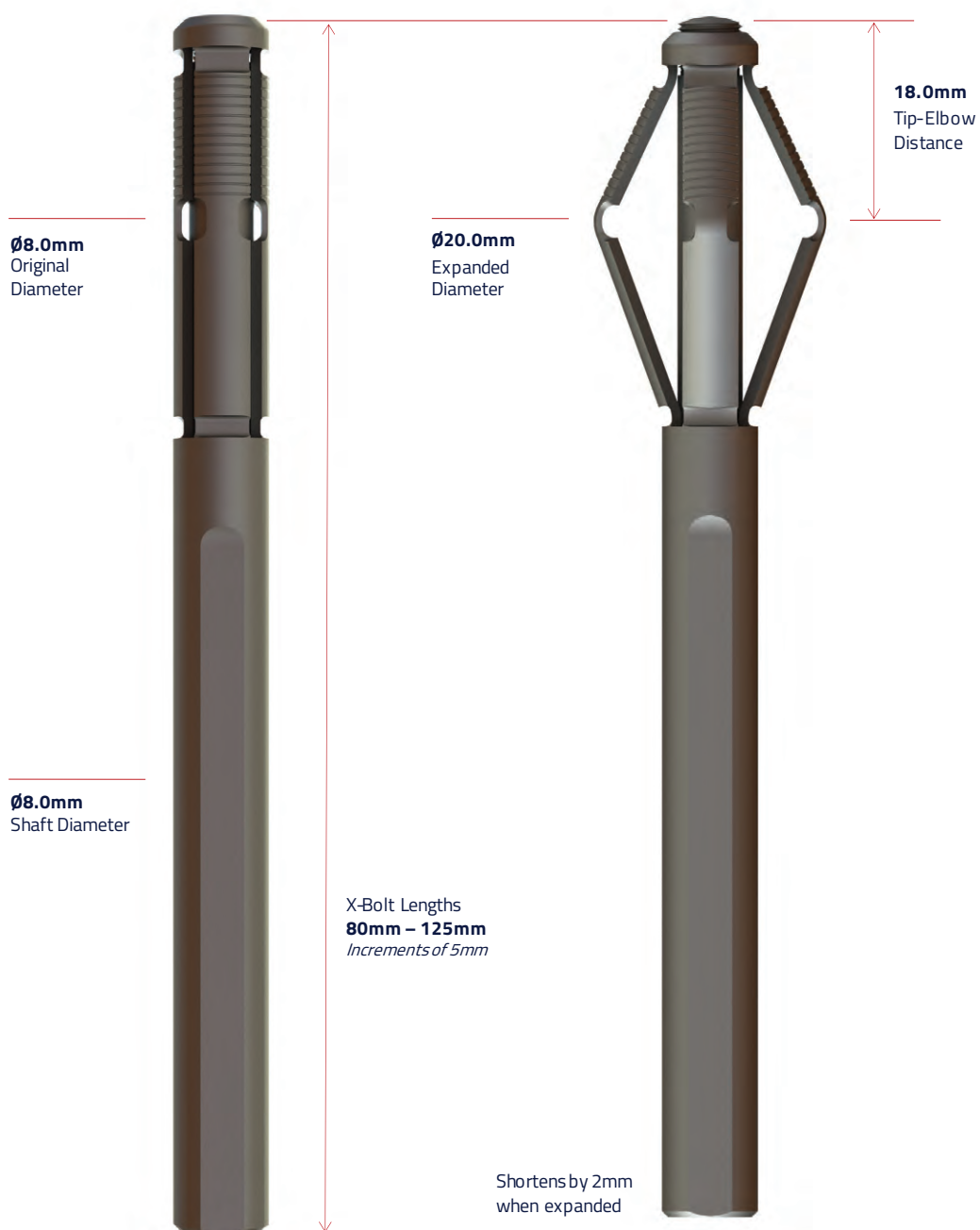




# Implant Dimensions

## X-BOLT® (EXPANDING BOLT)

- > Tip-apex and tip-elbow distance maintained throughout expansion
- > Actuated or reversed using T20 screwdriver
- > Maximal expansion of the four wings visible on orthogonal x-ray views



## Ordering Information

Part Code	Description (implants)
XHS040080S	80mm X-Bolt, 130° 4-hole LC-XHS plate (short barrel), stainless steel
XHS040085S	85mm X-Bolt, 130° 4-hole LC-XHS plate (short barrel), stainless steel
XHS040090	90mm X-Bolt, 130° 4-hole LC-XHS plate, stainless steel
XHS040095	95mm X-Bolt, 130° 4-hole LC-XHS plate, stainless steel
XHS040100	100mm X-Bolt, 130° 4-hole LC-XHS plate, stainless steel
XHS040105	105mm X-Bolt, 130° 4-hole LC-XHS plate, stainless steel
XHS040110	110mm X-Bolt, 130° 4-hole LC-XHS plate, stainless steel
XHS040115	115mm X-Bolt, 130° 4-hole LC-XHS plate, stainless steel
XHS040120	120mm X-Bolt, 130° 4-hole LC-XHS plate, stainless steel
XHS040125	125mm X-Bolt, 130° 4-hole LC-XHS plate, stainless steel
XHS020130	130° 2-hole LC-XHS plate, stainless steel
XHS020130S	130° 2-hole LC-XHS plate (short barrel), stainless steel
XHS060130	130° 6-hole LC-XHS plate, stainless steel
XHS040135	135° 4-hole LC-XHS plate, stainless steel
XHS045030	30mm, Ø4.5mm self-tapping cortical screw, stainless steel
XHS045032	32mm, Ø4.5mm self-tapping cortical screw, stainless steel
XHS045034	34mm, Ø4.5mm self-tapping cortical screw, stainless steel
XHS045036	36mm, Ø4.5mm self-tapping cortical screw, stainless steel
XHS045038	38mm, Ø4.5mm self-tapping cortical screw, stainless steel
XHS045040	40mm, Ø4.5mm self-tapping cortical screw, stainless steel
XHS045042	42mm, Ø4.5mm self-tapping cortical screw, stainless steel
XHS045044	44mm, Ø4.5mm self-tapping cortical screw, stainless steel
Part Code	Description (single use instruments)
XBT032001	Ø3.2mm x 390mm femoral head K-wire
XHS032145	Ø3.2mm x 145mm drill bit, quick connect



The information presented in this brochure is intended as an educational tool and clinical aid to assist properly licensed medical professionals in the usage of specific X-Bolt products. Always refer to the package insert, product label and instructions for use before using any X-Bolt product. Surgeons must always rely on their own clinical judgement, training and expertise when deciding which products and techniques to use with their patients.

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Registered in Ireland, No. 439651

European Patents: EP 2175790, EP 3496637, EP 2175790  
US Patents: US 972424B2, US 8911446B2

ST-XHS-001

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