

# ZNN™ BACTIGUARD® System

## Tibial Nail

Surgical Technique



Bactiguard® Implants

**VIGILENZ®**  
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## Product Overview

The ZNN BACTIGUARD System is a system of intramedullary nails, screws, instruments and other associated implants that are designed to provide stable internal fixation for fractured long bones. The nails have been designed for specific applications to help restore the shape of the fractured bone to its natural, pre-injured state.

The Tibial Nail is designed to help treat various fractures of the tibia. Screws are placed through the nail to secure the implant in place and maintain length and alignment while healing occurs. The nail has multiple screw holes in the proximal body to allow surgeons to address different fracture types. The proximal slot allows for compression or dynamization across a fracture.

A choice of lengths and diameters is available to match the individual anatomy of the patient.

## BACTIGUARD® Overview

The Bactiguard Coating is a proprietary technology, comprised of 3 noble metals - silver, gold and palladium - designed to reduce microbial adhesion and subsequently implant-related infections\*.

## Implant Overview

### Nail Diameters:

8.3, 9.3, 10, 11, 12, 13, 14mm

### Nail Lengths:

24 to 44cm in 2cm increments

### Proximal Screw Diameter:

5.0mm

### Proximal Screw Lengths:

20 to 60mm in 2.5mm increments, 65 to 100mm in 5mm increments

### Distal Screw Diameter:

4.0mm for 8.3mm diameter nails

5.0mm for 9.3mm and larger diameter nails

### Distal Screw Lengths:

20 to 60mm in 2.5mm increments, 65 to 100mm in 5mm increments

### Materials:

Ti-6Al-4V alloy and Au-Ag-Pd coating

Precision instrumentation is provided to help implant the nail. Many of the instruments and implants feature color coding to help the surgical team use the system, easily and efficiently. Certain universal instruments are not color coded. The color coding system is referenced in the technique. A wall chart (97-2495-003-00) is also available to help explain the color coding system.

The technique is written to explain use of the TALL length guide which should be used when the knee is in flexion. A shorter guide (labeled SMALL) is also available for use when the knee is in extension. The use of these SMALL instruments requires a more distal incision. Differences between the SMALL and TALL technique will be noted.

\*Internal Testing Report: REP-15819 Evaluation of microbial adhesion to Bactiguard coated ZNN/ANN Titanium.

## Intended Use

ZNN™ Bactiguard® System is intended for use by orthopedic/trauma surgeons for temporary, internal fixation and stabilization of fractures and reconstruction of bones. The Bactiguard coating has been scientifically and clinically proven to reduce the risk of implant-related infections by preventing microorganism population infestation on the implant.\*\*

## Indications for Use

The ZNN™ Bactiguard® System Tibial Nails are indicated for temporary stabilization and fixation of tibial fractures and osteotomies.

## Contraindications

- A medullary canal obliterated by a previous fracture or tumor
- Bone shaft having excessive bow or a deformity
- Lack of bone substance or bone quality, which makes stable seating of the implant impossible
- All concomitant diseases that can impair the operation, functioning or the success of the implant
- Insufficient blood circulation
- Skeletally immature patients
- Infection

**WARNING:** This nail should only be used to treat a periprosthetic fracture if the in situ device is firmly fixed. When treating a periprosthetic fracture, the nail should be positioned so that it does not come in contact with the in situ device.

## Surgical Technique

### Preoperative Planning

Preoperative planning is recommended before beginning the surgical procedure. A/P and Lateral x-rays of the injured tibia should be taken preoperatively and evaluated for length, canal size and implant suitability. A/P and Lateral x-rays of the contralateral uninjured tibia can also be taken preoperatively to provide insight into the characteristics of the pre-injured tibia.

### Patient Positioning

The patient should be positioned in the supine position. The positioning should allow the knee of the injured leg to be placed in at least 90° of flexion. The use of a fracture table can be beneficial to help reduce fractures as well as to facilitate intraoperative imaging with a C-arm. The C-arm should be placed to allow for imaging of the tibia in both planes along the entire length of the bone.

Drape the patient appropriately to allow the surgeon to work from the knee to the foot.

**Note:** For the SMALL technique, the knee should be flexed between 20 and 45°. A small roll under the knee can be used to assist in positioning the patient.

### Reduction

It is critical to achieve anatomic reduction before beginning any of the steps to place the IM Nail. Traction should be used as necessary to help achieve fracture reduction. Several instruments are available to assist in fracture reduction including clamps, ball spike pushers and Steinmann pins.

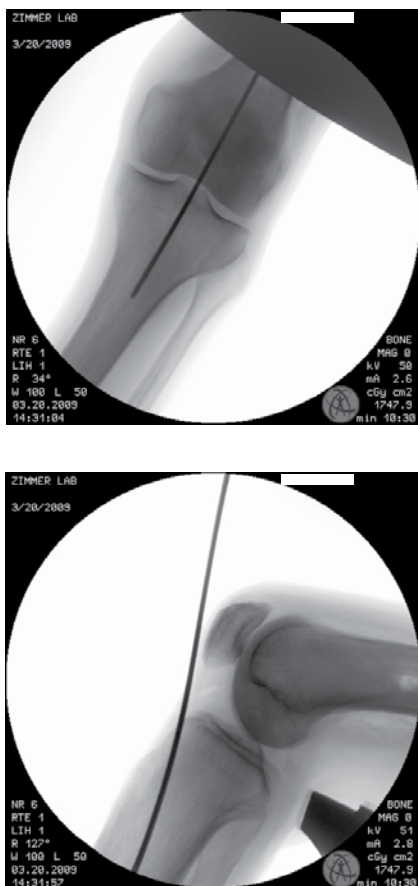


Figure 1



Figure 2

## Starting Point Location

The starting point for the nail is located on the shelf of the tibia, just medial to the Lateral Intracondylar Eminence. With the knee in flexion, incise the tissue along the medial border of the patellar ligament extending from the joint line to the inferior pole of the patella. There are several techniques for managing the patellar tendon and alternative incisions are also appropriate as long as they allow for nail entry at this point. Use a retractor if necessary to help manage the tendon.

**Small Technique Note:** As the knee is in a much less flexed position, the incision is more distal. The starting point in the bone remains the same, regardless of technique.

Place the 3.0mm pin into the starting point. Use the C-arm to visualize the pin's position from A/P and Lateral views. The pin should be inserted at the identified point heading slightly posterior into the medullary canal. The TISSUE PROTECTOR and retractors can help protect the surrounding soft tissues during the procedure.

Drive the pin through the starting point into the center of the medullary canal (Figure 1). Use the 8mm ENTRY REAMER to ream an entry portal into the proximal tibia through the starting point.

Alternatively, an AWL or a 12mm ENTRY REAMER can be used to find the entry point and create the entry portal (Figure 2).

Use the 12.0mm ENTRY REAMER to prepare the proximal tibia for the proximal portion of the nail. The groove indicates the final position of the top of the nail. In addition, the c-arm should be used to visualize the depth of the reamer in the proximal tibia. Care should be taken to keep the reamer in line with the shaft of the tibia to avoid reaming through the cortex of the tibia. Remove the reamer and 3.0mm pin.



Figure 3



Figure 4



Figure 5

### Starting Point Location (cont.)

Place a 3.0mm x 100cm ball tip guide wire (47/00-2255-008-01) into the medullary canal all the way into the distal tibia. The wire can be bent up to 20° distally in order to help it pass by the fracture site. Fluoroscopy can assist you in guiding the wire past the fracture site. If you plan to ream the canal of the tibia, the ball tip wire should be centered and embedded in the distal tibia at the level of the distal epiphyseal scar using the GUIDE WIRE GRIPPER and a MALLETT (Figure 3). Care should be taken not to drive the wire through the ankle joint.

Assemble the two piece NAIL LENGTH GAUGE. Slide the tube portion of the gauge over the 3.0mm x 100cm ball tip guide wire until the tip of the tube is at the level of the entry point (confirm position using fluoroscopy, Figure 4). The proximal end of the ball tip guide wire indicates the length of the wire in the canal (Figure 5). When determining nail length, consideration should be taken as to how deep the nail will be inserted into the tibia based upon the desired location of the proximal screws. A RULER is also included in the set which can be used to radiographically determine nail length.

- Note:** If a 70cm ball tip wire is used, measure the length of the canal by sliding only the half of the NAIL LENGTH GAUGE that is etched with length measurements to the level of the entry point. The proximal end of the 70cm ball tip wire will indicate the length of the wire that is in the canal.





Figure 6



Figure 7

## Reaming

Start with a small reamer. Increase the diameter of the reamer by 0.5 - 1.0mm depending on the amount of resistance felt while reaming (Figure 6). The GUIDE WIRE PUSHER can help prevent the ball tip guide wire from coming out of the tibia during reaming. When cortical chatter occurs, stop reaming. Choose a nail that is 1.0 – 1.5mm smaller than the last reamer used. The proximal diameter of nails equal to or smaller than 11mm in diameter is 11mm. For nails 11mm and larger in diameter, the diameter of the nail is constant. If a nail smaller than 11mm is to be used, be sure to ream the proximal portion of the bone to 11.5mm to accommodate the proximal portion of the nail.

**Note:** If the GUIDE WIRE becomes lodged within the reamer, use the GUIDE WIRE PUSHER to push the guide wire back into the IM canal.

## Nail Assembly and Insertion

The color code for the tibial nail is YELLOW. Ti-6Al-4V alloy nails, the TARGETING GUIDE and the CONNECTING BOLT all have yellow colors and the word YELLOW etched on them.

Place the appropriate CONNECTING BOLT (SMALL or TALL) through the barrel of the corresponding TARGETING GUIDE HANDLE. Begin threading the CONNECTING BOLT (by hand or using the CONNECTING BOLT INSERTER) into the proximal portion of the nail. Orient the nail so that the distal portion of the nail angles anterior, the same direction as the TARGETING GUIDE HANDLE (Figure 7).



Figure 8



Figure 9

### Nail Assembly and Insertion (cont.)

Slots in the top of the nail will match tabs on the TARGETING GUIDE HANDLE to help orient the nail correctly. Completely tighten the CONNECTING BOLT to secure the nail to the guide (Figure 8). The arrow on the nail will line up with the arrow on the barrel of the guide when the nail is correctly aligned.

Attach the TARGETING MODULE to the TARGETING GUIDE HANDLE. Use a screw barrel of the corresponding TARGETING GUIDE HANDLE. Begin threading the CONNECTING BOLT (by hand or using the CONNECTING BOLT INSERTER) into the proximal portion of the nail. Orient the nail so that the distal portion of the nail angles anterior, the same direction as the TARGETING GUIDE HANDLE (Figure 7).

Slots in the top of the nail will match tabs on the TARGETING GUIDE HANDLE to help orient the nail correctly. Completely tighten the CONNECTING BOLT to secure the nail to the guide (Figure 8). The arrow on the nail will line up with the arrow on the barrel of the guide when the nail is correctly aligned.

Attach the TARGETING MODULE to the TARGETING GUIDE HANDLE. Use a screw cannula, drill sleeve and drill bit to verify that the holes in the guide target the holes in the nail. Remove the TARGETING MODULE BEFORE inserting the nail.

Insert the nail over the guide wire with the arm of the guide facing anterior. Monitor the progression of the nail down the canal using the C-arm, especially as the nail is passing through or near the fracture site (Figure 9).



Figure 10



Figure 11

If the nail does not pass down the canal easily, attach the IMPACTION HEAD to the TARGETING GUIDE HANDLE. Using the MALLET, impact gently on the IMPACTION HEAD (Figure 10). Verify that the CONNECTING BOLT is tight while impacting. Do not impact on any other portion of the TARGETING GUIDE HANDLE or MODULE as this may break the guide or cause it to lose its accuracy. If the nail will not advance with impaction, remove the nail and ream the canal to a larger diameter at additional 0.5 mm increments or consider using a smaller diameter nail. Place the top of the nail in line with or below the surface of the tibia, depending on its position relative to the expected screw location.

Remove the ball tip guide wire from the nail using the GUIDE WIRE GRIPPER (Figure 11). If possible, remove the ball tip guide wire before fully seating the nail.



Figure 12

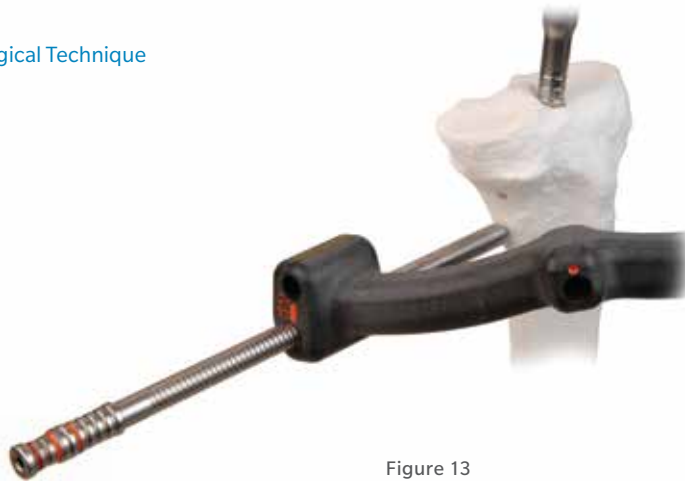


Figure 13



Figure 14

## Proximal Screw Placement

All of the screw holes in the tibial nail allow for standard locking or fixed angle locking. To achieve standard locking, choose a PARTIALLY THREADED SCREW\*. To achieve a fixed angle construct, choose a FULLY THREADED SCREW.

Instruments that are specific to the tibia nail are marked in YELLOW. The instruments needed to place screws through the proximal portion of the nail are color coded ORANGE/ORANGE. These instruments are placed through holes in the targeting guide which are colored coded ORANGE. The chart details the color coded instruments that are used to target and place screws.

Retighten the CONNECTING BOLT to the nail.

Attach the TARGETING MODULE to the TARGETING GUIDE HANDLE (Figure 12). Select the screw holes that will be used in the nail. Insert HOLE INDICATORS in the holes in the TARGETING MODULE that will NOT be used.

Slide the TROCAR into the SCREW CANNULA. Slide the SCREW CANNULA through one of the selected holes in the TARGETING MODULE. Dissect through the tissue down to the bone to make a path for the SCREW CANNULA (Figure 13). Advance the SCREW CANNULA until the tip of the TROCAR is against the bone (Figure 14).

| Instrument Type    | Color Code          |
|--------------------|---------------------|
| Screw Cannula      | Orange/Orange       |
| Trocar             | Orange/Orange       |
| 4.3mm Drill Sleeve | Orange/Orange & Red |
| 4.3mm Drill Bit    | Orange              |
| Depth Gauge        | Orange/Orange       |
| Screwdriver        | Orange/Orange       |

Remove the TROCAR. Insert the 4.3mm DRILL SLEEVE through the CANNULA down to the bone. Place the 4.3mm DRILL BIT through the DRILL SLEEVE. Before the DRILL BIT contacts the bone, start the drill. Advance the spinning DRILL BIT through the bone bicortically. Use fluoroscopy to verify the appropriate location of the DRILL BIT in the bone.

\*Under certain conditions, especially in patients with thin cortical bone, Partially Threaded Screws from 20mm to 32.5mm in length may form a Fixed Angle construct with the nail.



Figure 15



Figure 16



Figure 17

With the DRILL BIT in place and the DRILL SLEEVE pressed against the bone, the length of screw needed is indicated by the etch marks on the DRILL BIT where it exits the SCREW CANNULA (Figure 15). The tip of the drill should be no more than 5mm through the far cortex of the bone to reduce the risk of complications associated with screw protrusion. (Alternatively, the DRILL BIT and DRILL SLEEVE can be removed and the SCREW DEPTH GAUGE used to measure the length of screw.)

Remove the DRILL BIT and DRILL SLEEVE. Place the appropriate length 5.0mm screw (color coded RED) through the SCREW CANNULA into the bone (Figure 16).

Using the screwdriver, advance the screw to achieve bicortical purchase (the screw head should sit on the near cortex of the bone). The screws are self tapping so tapping should not be necessary (Figure 17).

If using the CAPTURED SCREWDRIVER, place the appropriate screw on the 3.5mm HEX and tighten the screw to the CAPTURED SCREWDRIVER by turning the knob next to the handle clockwise.

▶ **Caution:** If using the CAPTURED SCREWDRIVER, do not torque the CAPTURED SCREWDRIVER beyond the calibration line next to the handle. Do not drive the screws into the bone under power, as damage to the bone, screws and nail could result.

⊞ **Note:** Do not overtighten the screws.

Repeat this technique to place additional proximal screws as necessary.

⊞ **Note:** If axial compression is desired, please refer to the Axial Compression section on page 14.



Figure 18



Figure 19

## Distal Targeting – Freehand Technique

8.3mm nails utilize a 4.0mm screw (3.3mm drill bit) distally. These items are color coded WHITE.

9.3mm and larger diameter nails use a 5.0mm screw (4.3mm drill bit) distally. These items are color coded RED. Insert the appropriate diameter FREEHAND DRILL BIT into the DISTAL TARGETING WAND. Finger tighten the SET SCREW. Position the C-arm in order to get a lateral view of the distal tibia. Adjust the angle of the C-arm so that the hole through the nail appears as a perfect circle on the monitor. Bring the tip of the drill bit to the skin and use the C-arm to center it over the hole that you desire to place a screw through (Figure 18).

Make a stab incision at this point and dissect down to the bone. Place the tip of the drill bit against the bone. Verify that the tip of the drill bit is in the center of the hole. While keeping the tip of the drill bit against the bone, move the other end of the drill bit into other positions and take additional fluoroscopic images to verify the position of the tip in the center of the hole. Align the drill bit with the C-arm beam. Tap the drill bit into the bone using the MALLET.

Loosen the SET SCREW and remove the DISTAL TARGETING WAND, leaving the DRILL BIT in place. Slide the FREEHAND TISSUE PROTECTION SLEEVE over the DRILL BIT (Figure 19).

Attach the DRILL to the DRILL BIT and advance the drill bit through the bone. Verify that the drill bit has gone through the hole in the nail.

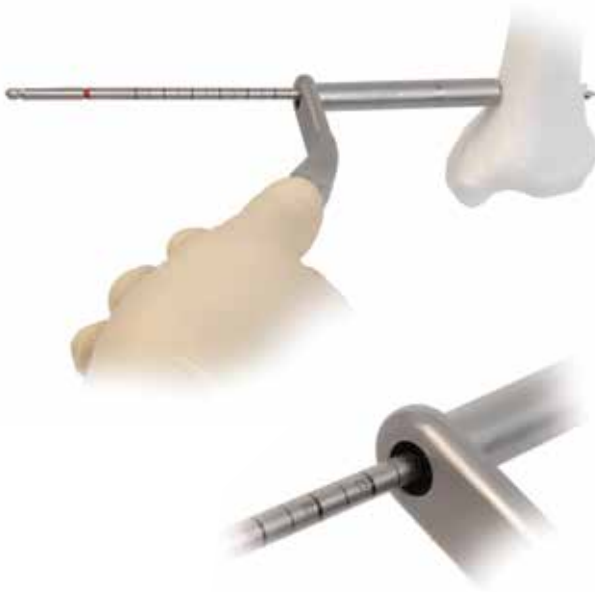


Figure 20



Figure 21

Remove the drill bit. Measure the depth of the hole using the FREEHAND SCREW DEPTH GAUGE. Alternatively, the appropriate length of screw can be measured using the numbered etch on the DRILL BIT closest to the end of the FREEHAND TISSUE PROTECTION SLEEVE when the DRILL BIT is in the bone and the SLEEVE is touching the bone (Figure 20). Insert the appropriate length screw using the screwdriver (Figure 21).

If using the CAPTURED SCREWDRIVER, place the appropriate screw on the 3.5mm HEX and tighten the screw to the CAPTURED SCREWDRIVER by turning the knob next to the handle clockwise.

**▶ Caution:** If using the CAPTURED SCREWDRIVER, do not torque the CAPTURED SCREWDRIVER beyond the calibration line next to the handle. Do not drive the screws into the bone under power, as damage to the bone, screws and nail could result.

**☰ Note:** Do not overtighten the screws.

Repeat these steps to insert additional distal screws.



Figure 22



Figure 23



Figure 24

## Axial Compression

In order to perform axial compression, only one screw can be placed proximally and it must be in the dynamization slot (marked DY on the TARGETING MODULE). At least one screw must be placed distally. Leave the SCREW CANNULA and SCREWDRIVER in place in the proximal screw that was placed in the dynamization slot during this step.

Remove the CONNECTING BOLT. Attach the AXIAL COMPRESSION DEVICE (YELLOW) to the T-HANDLE. Place the AXIAL COMPRESSION DEVICE through the barrel of the TARGETING GUIDE HANDLE and thread it into the proximal portion of the nail. The AXIAL COMPRESSION DEVICE will contact the proximal screw and move the two bone segments together. Remove the SCREW CANNULA and SCREWDRIVER before advancing the AXIAL COMPRESSION DEVICE.

Rotate the T-HANDLE clockwise. When the desired compression is achieved, tighten the nut of the AXIAL COMPRESSION DEVICE to the TARGETING GUIDE. Place at least one additional screw proximally to maintain the compression. Additional screws can be placed proximally and distally as appropriate.

## Finalize Implant Placements

Observe the depth of the nail in the proximal tibia. Ridges in the targeting guide barrel indicate depths of 5 and 10mm. Disconnect the TARGETING MODULE from the TARGETING GUIDE HANDLE and set aside. Place a 2.0MM GUIDE PIN through the guide against the proximal screws. Loosen and remove the CONNECTING BOLT from the nail (Figure 22). Remove the TARGETING GUIDE HANDLE and set aside. Choose the appropriate height TIBIAL NAIL CAP. Secure the selected NAIL CAP to the NAIL CAP INSERTER using the NAIL CAP RETAINING SHAFT (Figure 23). Slide the TIBIAL NAIL CAP over the 2.0MM GUIDE PIN and tighten to the nail (Figure 24). Using the C-arm, verify that the cap is completely seated to the top of the nail.

Disengage the NAIL CAP INSERTER from the TIBIAL NAIL CAP. Remove the 2.0MM GUIDE PIN. Close all wounds and apply the appropriate dressings.



## Postoperative Care

Early range of motion exercises of the knee and ankle are encouraged. Allow toe-touch weight bearing to progress to full weight bearing as fracture callus increases on the x-ray films.

## Nail Extraction

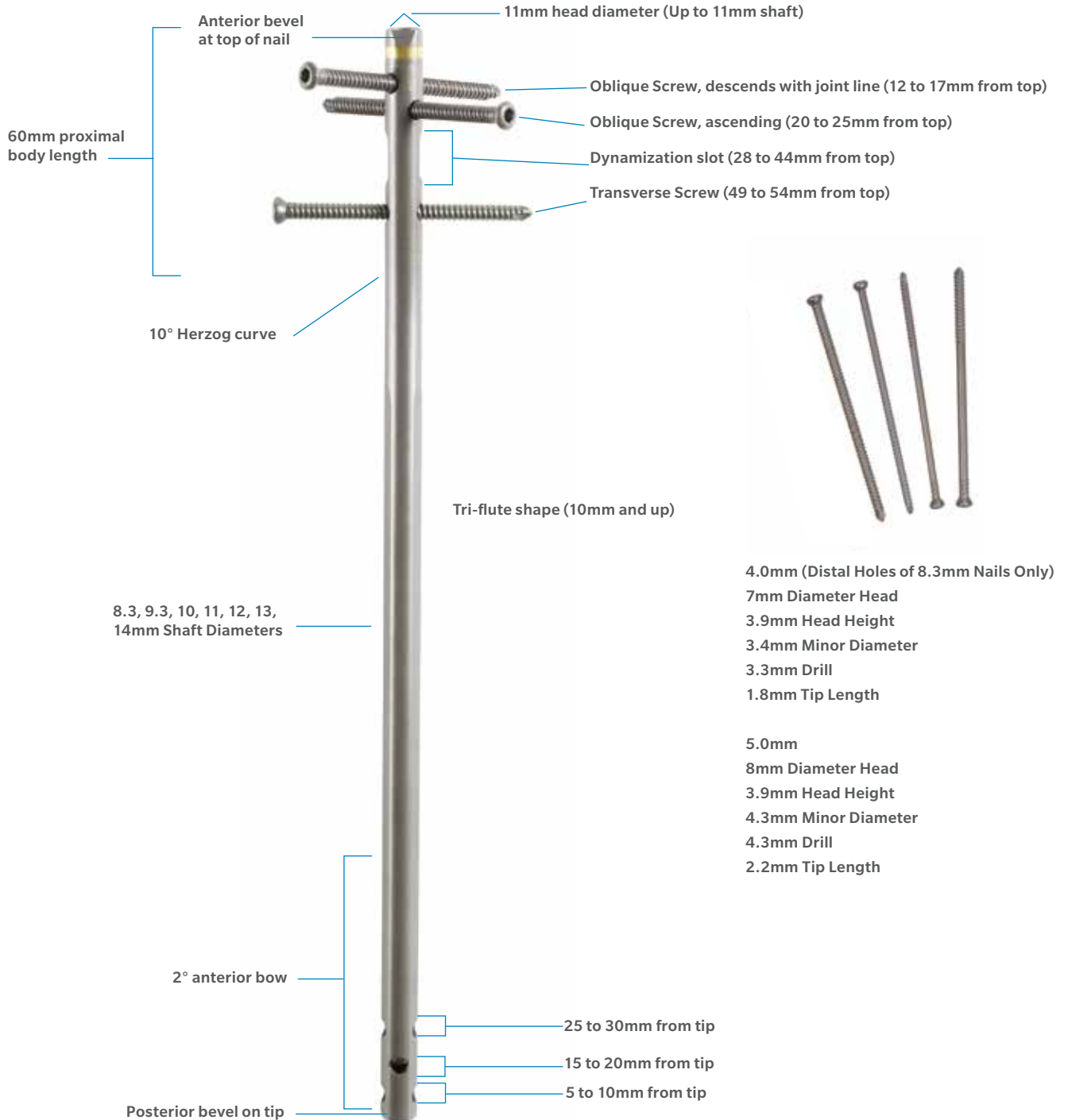
Before attempting to remove any screws or nail caps, clean any bone from the hex of the screw or cap.

Use the C-arm to locate any distal screws. Remove the screws using a 3.5mm hex screwdriver. Remove the nail cap (if one was inserted) with the CONNECTING BOLT INSERTER or another Zimmer 5.0mm hex screwdriver. Expose the proximal screws and use a 3.5mm hex screwdriver to remove them.

 **Note:** Use the specific captured screwdriver.

To remove the nail, slide a 2.0mm Guide Pin through the nail. Insert the CANNULATED EXTRACTION ADAPTER over the wire into the top of the nail. Tighten the adapter to the nail. Attach a saphammer or other impaction device and impact to back out the nail.

## ZNN Bactiguard Tibial Nail Details



## Case Examples (ZNN Implants)



Pre-Op



Post-Op



Pre-Op



Post-Op

## Product Information

### ZNN BG Tibial Nails

| Item Number    | Product Description            |
|----------------|--------------------------------|
| 47-2595-240-08 | ZNN BG Tibia Nail 8.3mm X 24cm |
| 47-2595-260-08 | ZNN BG Tibia Nail 8.3mm X 26cm |
| 47-2595-280-08 | ZNN BG Tibia Nail 8.3mm X 28cm |
| 47-2595-300-08 | ZNN BG Tibia Nail 8.3mm X 30cm |
| 47-2595-320-08 | ZNN BG Tibia Nail 8.3mm X 32cm |
| 47-2595-340-08 | ZNN BG Tibia Nail 8.3mm X 34cm |
| 47-2595-360-08 | ZNN BG Tibia Nail 8.3mm X 36cm |
| 47-2595-380-08 | ZNN BG Tibia Nail 8.3mm X 38cm |
| 47-2595-400-08 | ZNN BG Tibia Nail 8.3mm X 40cm |
| 47-2595-420-08 | ZNN BG Tibia Nail 8.3mm X 42cm |
| 47-2595-440-08 | ZNN BG Tibia Nail 8.3mm X 44cm |
| 47-2595-240-09 | ZNN BG Tibia Nail 9.3mm X 24cm |
| 47-2595-260-09 | ZNN BG Tibia Nail 9.3mm X 26cm |
| 47-2595-280-09 | ZNN BG Tibia Nail 9.3mm X 28cm |
| 47-2595-300-09 | ZNN BG Tibia Nail 9.3mm X 30cm |
| 47-2595-320-09 | ZNN BG Tibia Nail 9.3mm X 32cm |
| 47-2595-340-09 | ZNN BG Tibia Nail 9.3mm X 34cm |
| 47-2595-360-09 | ZNN BG Tibia Nail 9.3mm X 36cm |
| 47-2595-380-09 | ZNN BG Tibia Nail 9.3mm X 38cm |
| 47-2595-400-09 | ZNN BG Tibia Nail 9.3mm X 40cm |
| 47-2595-420-09 | ZNN BG Tibia Nail 9.3mm X 42cm |
| 47-2595-440-09 | ZNN BG Tibia Nail 9.3mm X 44cm |
| 47-2595-240-10 | ZNN BG Tibia Nail 10mm X 24cm  |
| 47-2595-260-10 | ZNN BG Tibia Nail 10mm X 26cm  |
| 47-2595-280-10 | ZNN BG Tibia Nail 10mm X 28cm  |
| 47-2595-300-10 | ZNN BG Tibia Nail 10mm X 30cm  |
| 47-2595-320-10 | ZNN BG Tibia Nail 10mm X 32cm  |
| 47-2595-340-10 | ZNN BG Tibia Nail 10mm X 34cm  |
| 47-2595-360-10 | ZNN BG Tibia Nail 10mm X 36cm  |
| 47-2595-380-10 | ZNN BG Tibia Nail 10mm X 38cm  |
| 47-2595-400-10 | ZNN BG Tibia Nail 10mm X 40cm  |
| 47-2595-420-10 | ZNN BG Tibia Nail 10mm X 42cm  |
| 47-2595-440-10 | ZNN BG Tibia Nail 10mm X 44cm  |
| 47-2595-240-11 | ZNN BG Tibia Nail 11mm X 24cm  |
| 47-2595-260-11 | ZNN BG Tibia Nail 11mm X 26cm  |
| 47-2595-280-11 | ZNN BG Tibia Nail 11mm X 28cm  |
| 47-2595-300-11 | ZNN BG Tibia Nail 11mm X 30cm  |
| 47-2595-320-11 | ZNN BG Tibia Nail 11mm X 32cm  |

| Item Number    | Product Description           |
|----------------|-------------------------------|
| 47-2595-340-11 | ZNN BG Tibia Nail 11mm X 34cm |
| 47-2595-360-11 | ZNN BG Tibia Nail 11mm X 36cm |
| 47-2595-380-11 | ZNN BG Tibia Nail 11mm X 38cm |
| 47-2595-400-11 | ZNN BG Tibia Nail 11mm X 40cm |
| 47-2595-420-11 | ZNN BG Tibia Nail 11mm X 42cm |
| 47-2595-440-11 | ZNN BG Tibia Nail 11mm X 44cm |
| 47-2595-240-12 | ZNN BG Tibia Nail 12mm X 24cm |
| 47-2595-260-12 | ZNN BG Tibia Nail 12mm X 26cm |
| 47-2595-280-12 | ZNN BG Tibia Nail 12mm X 28cm |
| 47-2595-300-12 | ZNN BG Tibia Nail 12mm X 30cm |
| 47-2595-320-12 | ZNN BG Tibia Nail 12mm X 32cm |
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| 47-2595-420-12 | ZNN BG Tibia Nail 12mm X 42cm |
| 47-2595-440-12 | ZNN BG Tibia Nail 12mm X 44cm |
| 47-2595-240-13 | ZNN BG Tibia Nail 13mm X 24cm |
| 47-2595-260-13 | ZNN BG Tibia Nail 13mm X 26cm |
| 47-2595-280-13 | ZNN BG Tibia Nail 13mm X 28cm |
| 47-2595-300-13 | ZNN BG Tibia Nail 13mm X 30cm |
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| 47-2595-420-13 | ZNN BG Tibia Nail 13mm X 42cm |
| 47-2595-440-13 | ZNN BG Tibia Nail 13mm X 44cm |
| 47-2595-240-14 | ZNN BG Tibia Nail 14mm X 24cm |
| 47-2595-260-14 | ZNN BG Tibia Nail 14mm X 26cm |
| 47-2595-280-14 | ZNN BG Tibia Nail 14mm X 28cm |
| 47-2595-300-14 | ZNN BG Tibia Nail 14mm X 30cm |
| 47-2595-320-14 | ZNN BG Tibia Nail 14mm X 32cm |
| 47-2595-340-14 | ZNN BG Tibia Nail 14mm X 34cm |
| 47-2595-360-14 | ZNN BG Tibia Nail 14mm X 36cm |
| 47-2595-380-14 | ZNN BG Tibia Nail 14mm X 38cm |
| 47-2595-400-14 | ZNN BG Tibia Nail 14mm X 40cm |
| 47-2595-420-14 | ZNN BG Tibia Nail 14mm X 42cm |
| 47-2595-440-14 | ZNN BG Tibia Nail 14mm X 44cm |

## ZNN BG 4.0mm Screws (for distal screw holes on 8.3mm nails)

### Partially Threaded

| Item Number    | Product Description                   |
|----------------|---------------------------------------|
| 47-2583-020-40 | BG 4.0mm Cortical Screw 20mm Length   |
| 47-2583-022-40 | BG 4.0mm Cortical Screw 22.5mm Length |
| 47-2583-025-40 | BG 4.0mm Cortical Screw 25mm Length   |
| 47-2583-027-40 | BG 4.0mm Cortical Screw 27.5mm Length |
| 47-2583-030-40 | BG 4.0mm Cortical Screw 30mm Length   |
| 47-2583-032-40 | BG 4.0mm Cortical Screw 32.5mm Length |
| 47-2583-035-40 | BG 4.0mm Cortical Screw 35mm Length   |
| 47-2583-037-40 | BG 4.0mm Cortical Screw 37.5mm Length |
| 47-2583-040-40 | BG 4.0mm Cortical Screw 40mm Length   |
| 47-2583-042-40 | BG 4.0mm Cortical Screw 42.5mm Length |
| 47-2583-045-40 | BG 4.0mm Cortical Screw 45mm Length   |
| 47-2583-047-40 | BG 4.0mm Cortical Screw 47.5mm Length |
| 47-2583-050-40 | BG 4.0mm Cortical Screw 50mm Length   |
| 47-2583-052-40 | BG 4.0mm Cortical Screw 52.5mm Length |
| 47-2583-055-40 | BG 4.0mm Cortical Screw 55mm Length   |
| 47-2583-057-40 | BG 4.0mm Cortical Screw 57.5mm Length |
| 47-2583-060-40 | BG 4.0mm Cortical Screw 60mm Length   |
| 47-2583-065-40 | BG 4.0mm Cortical Screw 65mm Length   |
| 47-2583-070-40 | BG 4.0mm Cortical Screw 70mm Length   |
| 47-2583-075-40 | BG 4.0mm Cortical Screw 75mm Length   |
| 47-2583-080-40 | BG 4.0mm Cortical Screw 80mm Length   |
| 47-2583-085-40 | BG 4.0mm Cortical Screw 85mm Length   |
| 47-2583-090-40 | BG 4.0mm Cortical Screw 90mm Length   |
| 47-2583-095-40 | BG 4.0mm Cortical Screw 95mm Length   |
| 47-2583-100-40 | BG 4.0mm Cortical Screw 100mm Length  |

### Fully Threaded

| Item Number    | Product Description                   |
|----------------|---------------------------------------|
| 47-2584-020-40 | BG 4.0mm Cortical Screw 20mm Length   |
| 47-2584-022-40 | BG 4.0mm Cortical Screw 22.5mm Length |
| 47-2584-025-40 | BG 4.0mm Cortical Screw 25mm Length   |
| 47-2584-027-40 | BG 4.0mm Cortical Screw 27.5mm Length |
| 47-2584-030-40 | BG 4.0mm Cortical Screw 30mm Length   |
| 47-2584-032-40 | BG 4.0mm Cortical Screw 32.5mm Length |
| 47-2584-035-40 | BG 4.0mm Cortical Screw 35mm Length   |
| 47-2584-037-40 | BG 4.0mm Cortical Screw 37.5mm Length |
| 47-2584-040-40 | BG 4.0mm Cortical Screw 40mm Length   |
| 47-2584-042-40 | BG 4.0mm Cortical Screw 42.5mm Length |
| 47-2584-045-40 | BG 4.0mm Cortical Screw 45mm Length   |
| 47-2584-047-40 | BG 4.0mm Cortical Screw 47.5mm Length |
| 47-2584-050-40 | BG 4.0mm Cortical Screw 50mm Length   |
| 47-2584-052-40 | BG 4.0mm Cortical Screw 52.5mm Length |
| 47-2584-055-40 | BG 4.0mm Cortical Screw 55mm Length   |
| 47-2584-057-40 | BG 4.0mm Cortical Screw 57.5mm Length |
| 47-2584-060-40 | BG 4.0mm Cortical Screw 60mm Length   |
| 47-2584-065-40 | BG 4.0mm Cortical Screw 65mm Length   |
| 47-2584-070-40 | BG 4.0mm Cortical Screw 70mm Length   |
| 47-2584-075-40 | BG 4.0mm Cortical Screw 75mm Length   |
| 47-2584-080-40 | BG 4.0mm Cortical Screw 80mm Length   |
| 47-2584-085-40 | BG 4.0mm Cortical Screw 85mm Length   |
| 47-2584-090-40 | BG 4.0mm Cortical Screw 90mm Length   |
| 47-2584-095-40 | BG 4.0mm Cortical Screw 95mm Length   |
| 47-2584-100-40 | BG 4.0mm Cortical Screw 100mm Length  |

## Product Information (cont.)

ZNN BG 5.0mm Screws (For all proximal screw holes on all nails and distal screw holes on 9.3mm nails and larger)

### Partially Threaded

| Item Number    | Product Description                   |
|----------------|---------------------------------------|
| 47-2583-020-50 | BG 5.0mm Cortical Screw 20mm Length   |
| 47-2583-022-50 | BG 5.0mm Cortical Screw 22.5mm Length |
| 47-2583-025-50 | BG 5.0mm Cortical Screw 25mm Length   |
| 47-2583-027-50 | BG 5.0mm Cortical Screw 27.5mm Length |
| 47-2583-030-50 | BG 5.0mm Cortical Screw 30mm Length   |
| 47-2583-032-50 | BG 5.0mm Cortical Screw 32.5mm Length |
| 47-2583-035-50 | BG 5.0mm Cortical Screw 35mm Length   |
| 47-2583-037-50 | BG 5.0mm Cortical Screw 37.5mm Length |
| 47-2583-040-50 | BG 5.0mm Cortical Screw 40mm Length   |
| 47-2583-042-50 | BG 5.0mm Cortical Screw 42.5mm Length |
| 47-2583-045-50 | BG 5.0mm Cortical Screw 45mm Length   |
| 47-2583-047-50 | BG 5.0mm Cortical Screw 47.5mm Length |
| 47-2583-050-50 | BG 5.0mm Cortical Screw 50mm Length   |
| 47-2583-052-50 | BG 5.0mm Cortical Screw 52.5mm Length |
| 47-2583-055-50 | BG 5.0mm Cortical Screw 55mm Length   |
| 47-2583-057-50 | BG 5.0mm Cortical Screw 57.5mm Length |
| 47-2583-060-50 | BG 5.0mm Cortical Screw 60mm Length   |
| 47-2583-065-50 | BG 5.0mm Cortical Screw 65mm Length   |
| 47-2583-070-50 | BG 5.0mm Cortical Screw 70mm Length   |
| 47-2583-075-50 | BG 5.0mm Cortical Screw 75mm Length   |
| 47-2583-080-50 | BG 5.0mm Cortical Screw 80mm Length   |
| 47-2583-085-50 | BG 5.0mm Cortical Screw 85mm Length   |
| 47-2583-090-50 | BG 5.0mm Cortical Screw 90mm Length   |
| 47-2583-095-50 | BG 5.0mm Cortical Screw 95mm Length   |
| 47-2583-100-50 | BG 5.0mm Cortical Screw 100mm Length  |

### Fully Threaded

| Item Number    | Product Description                   |
|----------------|---------------------------------------|
| 47-2584-020-50 | BG 5.0mm Cortical Screw 20mm Length   |
| 47-2584-022-50 | BG 5.0mm Cortical Screw 22.5mm Length |
| 47-2584-025-50 | BG 5.0mm Cortical Screw 25mm Length   |
| 47-2584-027-50 | BG 5.0mm Cortical Screw 27.5mm Length |
| 47-2584-030-50 | BG 5.0mm Cortical Screw 30mm Length   |
| 47-2584-032-50 | BG 5.0mm Cortical Screw 32.5mm Length |
| 47-2584-035-50 | BG 5.0mm Cortical Screw 35mm Length   |
| 47-2584-037-50 | BG 5.0mm Cortical Screw 37.5mm Length |
| 47-2584-040-50 | BG 5.0mm Cortical Screw 40mm Length   |
| 47-2584-042-50 | BG 5.0mm Cortical Screw 42.5mm Length |
| 47-2584-045-50 | BG 5.0mm Cortical Screw 45mm Length   |
| 47-2584-047-50 | BG 5.0mm Cortical Screw 47.5mm Length |
| 47-2584-050-50 | BG 5.0mm Cortical Screw 50mm Length   |
| 47-2584-052-50 | BG 5.0mm Cortical Screw 52.5mm Length |
| 47-2584-055-50 | BG 5.0mm Cortical Screw 55mm Length   |
| 47-2584-057-50 | BG 5.0mm Cortical Screw 57.5mm Length |
| 47-2584-060-50 | BG 5.0mm Cortical Screw 60mm Length   |
| 47-2584-065-50 | BG 5.0mm Cortical Screw 65mm Length   |
| 47-2584-070-50 | BG 5.0mm Cortical Screw 70mm Length   |
| 47-2584-075-50 | BG 5.0mm Cortical Screw 75mm Length   |
| 47-2584-080-50 | BG 5.0mm Cortical Screw 80mm Length   |
| 47-2584-085-50 | BG 5.0mm Cortical Screw 85mm Length   |
| 47-2584-090-50 | BG 5.0mm Cortical Screw 90mm Length   |
| 47-2584-095-50 | BG 5.0mm Cortical Screw 95mm Length   |
| 47-2584-100-50 | BG 5.0mm Cortical Screw 100mm Length  |

## ZNN BG Nail Caps

| Item Number    | Product Description               |
|----------------|-----------------------------------|
| 47-2587-005-00 | ZNN BG Tibia Nail Cap 0mm Height  |
| 47-2587-005-05 | ZNN BG Tibia Nail Cap 5mm Height  |
| 47-2587-005-10 | ZNN BG Tibia Nail Cap 10mm Height |
| 47-2587-005-15 | ZNN BG Tibia Nail Cap 15mm Height |

## Instruments

### KT-2490-005-00 – SMALL Tibia Nail Instrument Set

| Item Number    | Product Description                          |
|----------------|--|
| 02.00020.049   | Ratchet Wrench 11mm                          |
| 00-2237-008-00 | Skin Protector                               |
| 00-2490-000-14 | Connecting Knob                              |
| 00-2490-000-30 | Nail Diameter Gauge                          |
| 00-2490-000-33 | Ruler  |
| 00-2490-000-34 | Nail Length Gauge                            |
| 00-2490-000-41 | Hole Indicator                               |
| 00-2490-005-01 | Small Tibial Connecting Bolt                 |
| 00-2490-005-05 | Tibial Module                                |
| 00-2490-005-10 | Tibial Targeting Guide Small Handle          |
| 00-2490-005-49 | Tibial Axial Compression Device              |
| 00-2490-010-01 | Short Cannulated Awl                         |
| 00-2490-010-02 | 7mm Diameter Awl - Angled Tip                |
| 00-2490-012-00 | Guide Wire Gripper                           |
| 00-2490-014-80 | Entry Reamer 8mm                             |
| 00-2490-017-00 | Guide Wire Pusher                            |
| 00-2490-031-00 | Connecting Bolt Inserter                     |
| 00-2490-031-05 | 11mm Hex/ Pin Wrench                         |
| 00-2490-032-00 | Impaction Head                               |
| 00-2490-032-01 | Slotted Mallet                               |
| 00-2490-033-00 | Slap Hammer Adapter                          |
| 00-2490-035-50 | Tibial/Humeral Modular Screwdriver 3.5mm Hex |
| 00-2490-035-62 | Short 3.5mm Hex Screwdriver - Captured       |
| 00-2490-035-72 | Freehand 3.5mm Hex Screwdriver - Captured    |
| 00-2490-035-75 | Freehand Modular 3.5mm Hex Screwdriver       |

| Item Number    | Product Description                 |
|----------------|-------------------------------------|
| 00-2490-046-20 | 2.0mm Pin                           |
| 00-2490-046-30 | 3.0mm Threaded Pin                  |
| 00-2490-046-32 | Guide Pin Inserter / Extractor      |
| 00-2490-050-00 | Modular Handle AO                   |
| 00-2490-050-02 | Modular T-Handle                    |
| 00-2490-051-80 | Tibial/Humeral Screw Cannula 8.0mm  |
| 00-2490-052-80 | Tibial/Humeral Screw Trocar 8.0mm   |
| 00-2490-053-43 | Tibial Drill Sleeve 4.3mm           |
| 00-2490-054-43 | Calibrated Drill 4.3mm Tibial       |
| 00-2490-065-80 | Short Screw Depth Gauge 8.0mm       |
| 00-2490-070-00 | Freehand Targeting Wand             |
| 00-2490-070-01 | Targeting Wand Set Screw            |
| 00-2490-072-33 | 3.3mm Freehand Targeting Drill      |
| 00-2490-072-43 | 4.3mm Freehand Targeting Drill      |
| 00-2490-073-00 | Freehand Targeting Depth Gauge      |
| 00-2490-074-00 | Freehand Tissue Protection Sleeve   |
| 00-2490-080-00 | Nail Cap Inserter                   |
| 00-2490-080-03 | Nail Cap Retaining Shaft            |
| 00-2490-090-00 | Cannulated Extraction Adapter 5/16" |

## Product Information (cont.)

### KT-2490-005-01 – TALL Tibia Nail Instrument Set

| Item Number    | Product Description                          |
|----------------|--|
| 02.00020.049   | Ratchet Wrench 11mm                          |
| 00-2237-008-00 | Skin Protector                               |
| 00-2490-000-14 | Connecting Knob                              |
| 00-2490-000-30 | Nail Diameter Gauge                          |
| 00-2490-000-33 | Ruler  |
| 00-2490-000-34 | Nail Length Gauge                            |
| 00-2490-000-41 | Hole Indicator                               |
| 00-2490-005-05 | Tibial Module                                |
| 00-2490-005-07 | Tall Tibial Connecting Bolt                  |
| 00-2490-005-13 | Tibia Targeting Guide Tall Handle            |
| 00-2490-005-49 | Tibial Axial Compression Device              |
| 00-2490-010-01 | Short Cannulated Awl                         |
| 00-2490-010-02 | 7mm Diameter Awl - Angled Tip                |
| 00-2490-012-00 | Guide Wire Gripper                           |
| 00-2490-014-80 | Entry Reamer 8mm                             |
| 00-2490-017-00 | Guide Wire Pusher                            |
| 00-2490-031-00 | Connecting Bolt Inserter                     |
| 00-2490-031-05 | 11mm Hex / Pin Wrench                        |
| 00-2490-032-00 | Impaction Head                               |
| 00-2490-032-01 | Slotted Mallet                               |
| 00-2490-033-00 | Slap Hammer Adapter                          |
| 00-2490-035-50 | Tibial/Humeral Modular Screwdriver 3.5mm Hex |
| 00-2490-035-62 | Short 3.5mm Hex Screwdriver - Captured       |
| 00-2490-035-72 | Freehand 3.5mm Hex Screwdriver - Captured    |
| 00-2490-035-75 | Freehand Modular 3.5mm Hex Screwdriver       |
| 00-2490-046-20 | 2.0mm Pin                                    |
| 00-2490-046-30 | 3.0mm Threaded Pin                           |
| 00-2490-046-32 | Guide Pin Inserter / Extractor               |
| 00-2490-050-00 | Modular Handle AO                            |
| 00-2490-050-02 | Modular T-Handle                             |
| 00-2490-051-80 | Tibial/Humeral Screw Cannula 8.0mm           |
| 00-2490-052-80 | Tibial/Humeral Screw Trocar 8.0mm            |
| 00-2490-053-43 | Tibial Drill Sleeve 4.3mm                    |
| 00-2490-054-43 | Calibrated Drill 4.3mm Tibial                |
| 00-2490-065-80 | Short Screw Depth Gauge 8.0mm                |

| Item Number    | Product Description                 |
|----------------|-------------------------------------|
| 00-2490-070-00 | Freehand Targeting Wand             |
| 00-2490-070-01 | Targeting Wand Set Screw            |
| 00-2490-072-33 | 3.3mm Freehand Targeting Drill      |
| 00-2490-072-43 | 4.3mm Freehand Targeting Drill      |
| 00-2490-073-00 | Freehand Targeting Depth Gauge      |
| 00-2490-074-00 | Freehand Tissue Protection Sleeve   |
| 00-2490-080-00 | Nail Cap Inserter                   |
| 00-2490-080-03 | Nail Cap Retaining Shaft            |
| 00-2490-090-00 | Cannulated Extraction Adapter 5/16" |

### Instrument Cases (Select both "Stainless Steel" or both "Stainless Steel and Aluminum" Cases)

| Item Number    | Product Description                               |
|----------------|---|
| 00-2490-075-50 | Tibial Case 1 of 2 – Stainless Steel and Aluminum |
| 00-2490-079-50 | Tibial Case 2 of 2 – Stainless Steel and Aluminum |
| 00-2490-075-00 | Tibial Case 1 of 2 – Stainless Steel              |
| 00-2490-079-00 | Tibial Case 2 of 2 – Stainless Steel              |
| 00-5900-099-00 | Case Lid  |

### Optional Instruments

| Item Number    | Product Description    |
|----------------|------------------------|
| 00-2490-005-04 | Tibial Module (Molded) |
| 00-2490-014-12 | Entry Reamer 12mm      |

### Ball Tip Guide Wire (available separately)

| Item Number    | Product Description                       |
|----------------|---|
| 00-2255-008-01 | 3.0mm Ball Tip Guide Wire 100cm           |
| 47-2255-008-01 | 3.0mm Ball Tip Guide Wire 100cm (Sterile) |
| 00-2255-008-00 | 2.4mm Ball Tip Guide Wire 70cm            |
| 47-2255-008-00 | 2.4mm Ball Tip Guide Wire 70cm (Sterile)  |



## KT-2490-020-00 – Reduction Instrument Set

| Item Number    | Product Description               |
|----------------|-----------------------------------|
| 00-2490-020-30 | 3.0mm Self Drilling Reduction Pin |
| 00-2490-020-50 | 5.0mm Self Drilling Reduction Pin |
| 00-2490-021-00 | Ball Spike Pusher                 |
| 00-2490-022-01 | Bone Clamp                        |
| 00-2490-022-02 | Verbrugge Clamp                   |
| 00-2490-022-03 | Reduction Tong                    |
| 00-2490-025-24 | Bone Hook Small - 24mm            |
| 00-2490-025-34 | Bone Hook Large - 34mm            |
| 00-2490-026-00 | Reduction Rod                     |
| 00-2490-050-00 | Modular T-Handle AO               |
| 00-2490-060-50 | Reduction Base and Tray           |
| 00-5900-099-00 | Case Lid                          |

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