

Small Bone Nail System – Fibular Nail

Surgical Technique

1. Indications

The AOS Fibular Nail is intended for fixation of fractures and osteotomies of the fibula, including fractures where the medullary canal is narrow or flexibility of the implant is paramount.

2. Preoperative Planning

Preoperative planning is recommended before beginning the surgical procedure. AP and lateral radiographs of the injured fibula should be taken preoperatively and evaluated for nail length, canal size, expected amount of reaming (if necessary), and screw length. Radiographs of the contralateral fibula can be used to provide insight into the anatomy of the pre-injured fibula.

3. Patient Positioning

The patient should be placed in a supine position on the fracture table. The C-arm should be positioned to allow for imaging of the fibula in AP and lateral planes along the entire length of the bone.

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

4. Incision

Make a 1 to 2 cm skin incision depending on the size of the patient, distal to the tip of the fibula. The incision is carried down through the skin and subcutaneous tissue, and the muscles are split in line with their course.

5. Entry Point

The entry point for the nail is located on the distal tip of the fibula. On the AP image, the starting point should be at the lateral edge of the articular facet towards the center of the proximal canal. On the lateral image, the starting point should be aligned with the canal axis. A 1.3mm guide wire or a 1.5mm guide pin can be used to establish the entry point in conjunction with fluoroscopy in the AP and lateral planes (**Fig. 1**).



Fig. 1

6. Guide Wire insertion and Fracture Reduction

Introduce the **1.3mm Double Round Guide Wire (0118)** and confirm its containment within the fibula by means of AP and lateral views. To assist in fracture reduction, a **Reduction Tool (0855-000)** may be utilized. Insert the **Reduction Tool (0855-000)** over the guide wire up to the level of the fracture and reduce the proximal fragment to the distal fragment. Advance the guide wire across the fracture until it is centered within the distal fragment. Verify containment of the guide wire within the fibula with image intensification.

Use the **6.1mm Entry Reamer (4019-000)** over the guide wire to drill out the proximal diameter for the nail. The diaphyseal canal can be reamed using the **Small Bone IM Reamers (4020-031/051, 3.1mm to 5.1mm)** while holding the reduction. Use the 2.6mm small bone reamer or larger for the 2.5mm nails. Use the 3.1mm small bone reamer or larger for the 3.0mm nails (**Fig. 2**).

NOTE: Never insert a nail that has a larger diameter than the last reamer used.



7. Nail Assembly and Insertion

Assemble the targeter by attaching the **Locking Targeting Arm Assembly (1291-000)** to the **Fibula Targeter (1293-000)** using the **Locking Knob (1298-000)**.

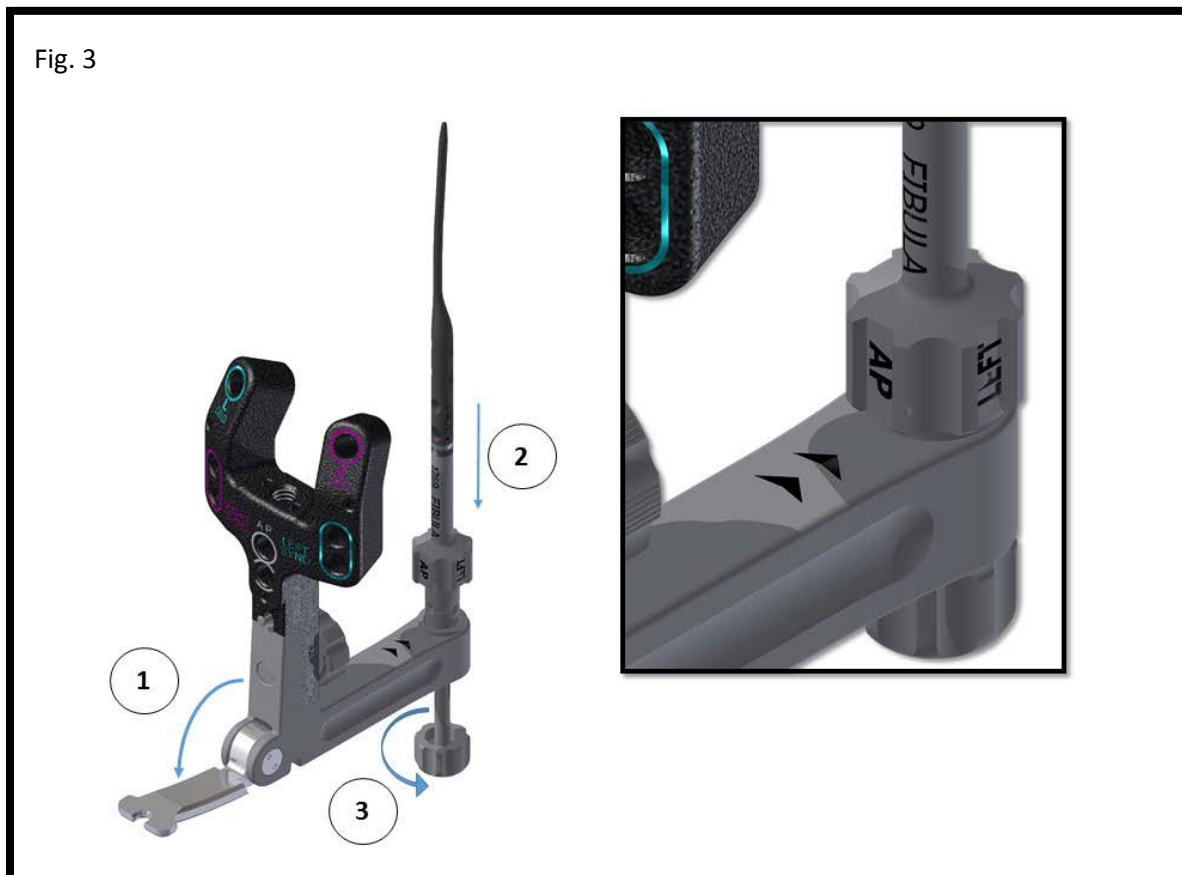
Insert the **Key Guide (1289-000)** into the Targeting Arm with the lever in the disengaged position. Align the arrows on the Targeting Arm to AP mode on the Key Guide then lock the lever.

Attach the assembled targeter to the nail using the **Small Bone Nail Locking Bolt (1295-000)**. The fibula nails have color-

coded bands to indicate the use for Right and Left fibulas. Left nails are color coded with a blue stripe, while Right nails are color coded with a magenta stripe.

Use the **Depth Gauge (0544-000)** over the guide wire to measure nail length and choose the appropriate nail.

Introduce the nail into the distal fibula using the targeter to control nail rotation. If a guide wire is used, pass the nail over the guide wire. Monitor the progression of the nail using the C-arm, particularly when the nail is passing through or near the fracture site. Remove the guide wire.



8. Proximal Screw Configurations

The fibula nails come in three screw configurations:

- 2 AP screws and 2 Syndesmotic screws
- 2 AP screws and 1 Syndesmotic screw and
- 2 AP screws and 1 oblique screw.

The table below displays the different nail options Screw Insertion; Insert different configurations.

The screws available for the proximal end of the nail are the **2.7mm Countersink Screw (8091-008/060)** and the **3.5mm Countersink Screw (8091-008/100)**.

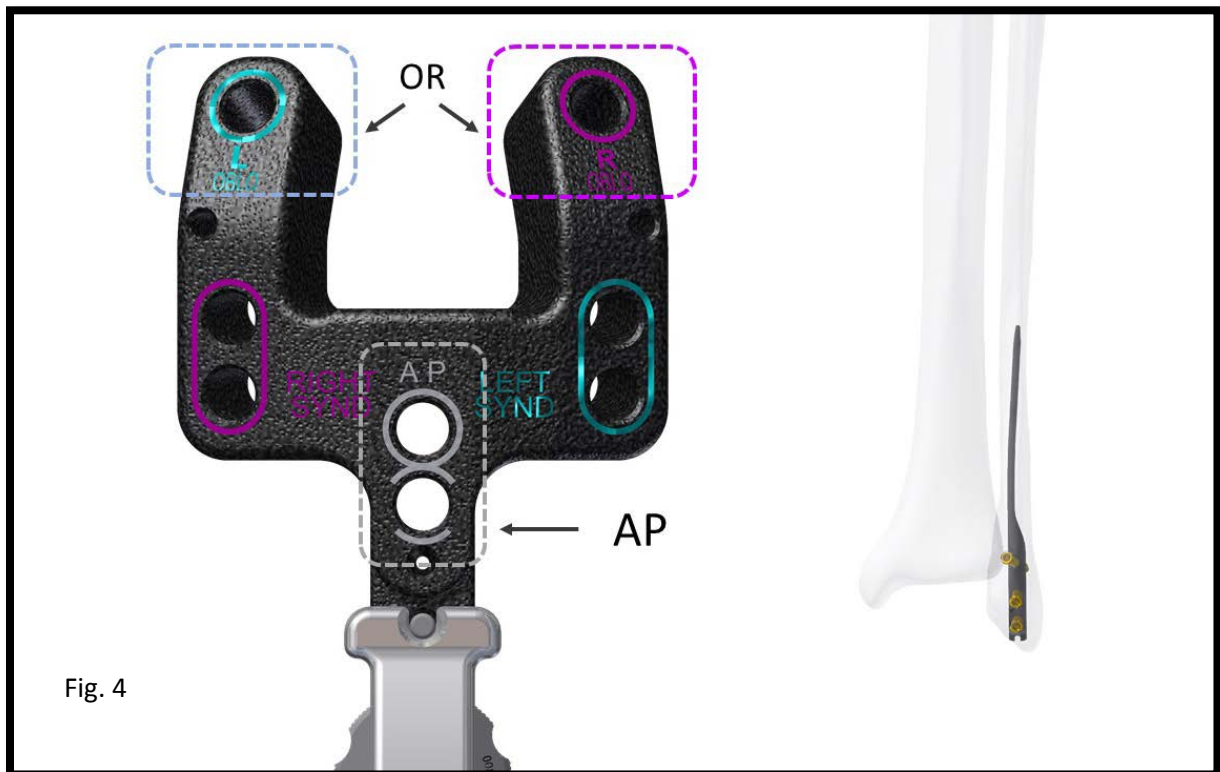
Part Number	Side	Shaft Diameter	AP Screws	Syndesmotic Screws	Oblique Screws
			<i>AP Mode</i>	<i>Lateral Mode</i>	<i>AP Mode</i>
1500-110/225	Left	2.5 mm	2	2	-
1502-110/225	Left	3.0 mm	2	2	-
1504-110/225	Left	2.5 mm	2	1	-
1506-110/225	Left	3.0 mm	2	1	-
1508-110/225	Left	2.5 mm	2	-	1
1510-110/225	Left	3.0 mm	2	-	1
1501-110/225	Right	2.5 mm	2	2	-
1503-110/225	Right	3.0 mm	2	2	-
1505-110/225	Right	2.5 mm	2	1	-
1507-110/225	Right	3.0 mm	2	1	-
1509-110/225	Right	2.5 mm	2	-	1
1511-110/225	Right	3.0 mm	2	-	1

9. Proximal Screw Locking

The targeter is designed with two modes: AP and lateral. Begin in the AP position. Maintain the reduction manually and insert the **Screw Sheath Assembly (0644-000)** and **2.5mm Drill Guide (0350-000)** into one of the AP holes in the targeter. Make an incision to allow the Screw Sheath Assembly and Drill Guide to be advanced to the bone. Use the **2.5mm Calibrated Drill (4016-000)** to drill to the second cortex. Measure off the calibration marks on the drill and insert the appropriate length screw. The screw should not penetrate the posterior cortex to avoid peroneal tendon irritation. Repeat with the second AP hole, if desired.

If a fibula nail with the configuration of 2 AP screws and 1 oblique screw is utilized, then the oblique screw can be inserted while the targeter is in AP mode (**Fig. 4**). Insert the **Screw Sheath Assembly (0644-000)** and **Drill Guide (0350-000)** into the corresponding labeled oblique hole in the targeter. Make an incision to allow the Screw Sheath Assembly and Drill Guide to be advanced to the bone. Use a **Calibrated Drill (4016-000)** to drill to the second cortex. Measure and insert the appropriate length screw.

Alternatively, 2.7mm screws may be used in the AP mode by using the 2.0mm Drill Guide and 2.0mm Drill



If a fibula nail with a configuration involving Syndesmotic screws is utilized, then the targeter must be pivoted 90° respective to the side being operated on. To pivot the targeter, lift the cam handle, rotate the targeter, and lock the handle. The targeter should now be aligned with the Syndesmotic screw holes in the nail.

Insert the **Screw Sheath Assembly (0644-000)** and **2.5mm Drill Guide (0353-000)** into the corresponding labeled syndesmotic hole in the targeter (**Fig. 5**). Make an incision to allow the Screw Sheath Assembly and Drill Guide to be advanced to the bone. Use a **2.5mm Calibrated Drill (4017-000)** to drill through at least three cortices. Measure and insert the appropriate length screw.



If blocking screws are desired, attach the **Blocking Screw Extension Arm Assembly (1292-000)** to the Fibula Targeter (**Fig 6**). The Blocking Screw Extension Arm Assembly has four sliding buttons which are able to move horizontally in both directions. Each button represents a different nail length. Insert the **Screw Sheath Assembly (0644-000)** and **Drill Guide (0350-000 or**

0353-000) into the hole labeled with the respective length of the nail in the targeter. Make an incision to allow the Screw Sheath Assembly and Drill Guide to be advanced to the bone. Use a **Calibrated Drill (4016-000 or 4017-000)** to drill to the second cortex. Measure and insert the appropriate length screw.

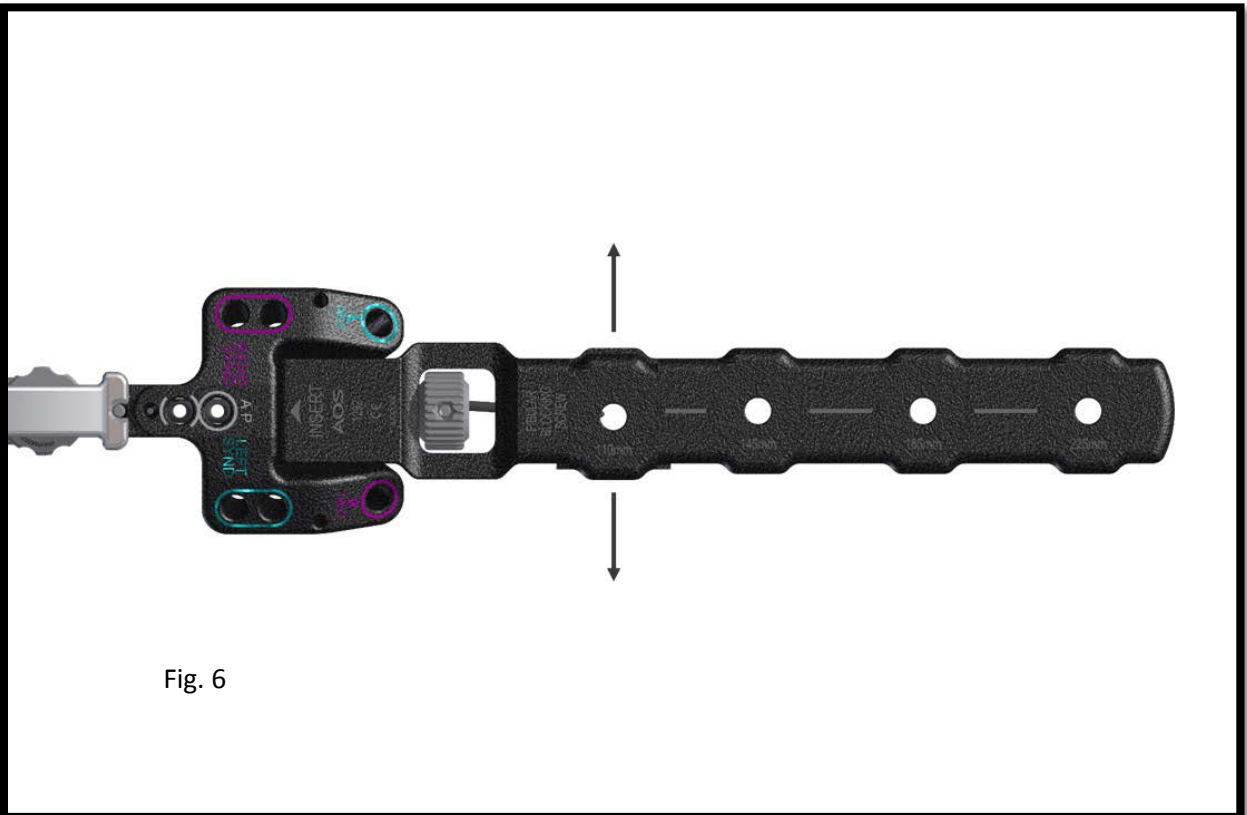


Fig. 6

10. Closure and Postoperative Protocol

After the nail and screws are inserted, the targeting guide can be removed from the fibula nail. The incision site can be closed using the surgeon's preferred method.

Mobilization of the patient is encouraged. The patient is usually allowed to be full weight-bearing, but it is the responsibility of the surgeon to determine the most suitable postoperative care.

11. Nail Extraction

Use the C-arm to locate any distal screws. Expose the screws and use a **T10 Screwdriver (5008-100 or 5020-000)** to remove them. If bone has grown into any of the screws or the nail which would inhibit implant removal, use instruments such as rongeurs, dental picks, or small curettes to remove the bone before attempting implant removal. Take care not to damage the implant while removing ingrown bone.

After removal of all the locking screws, locate the proximal end of the nail. Insert the **Extraction Bolt (0854-000)** in the proximal end of the nail and ensure that it engages with the threads in the proximal end of the nail. Turn the handle of the Extraction Bolt clockwise to extract the nail. Pull the nail out. Use the C-arm to visualize removal of the nail to avoid unnecessary damage to the fibula.

12. Disassembly Instructions

All instruments should be disassembled prior to cleaning and reprocessing for sterilization.

For the targeting arm, remove the Locking Knob from the Fibular Targeter and Locking Targeting Arm. Disengage the Targeting Arm and push the Key Guide out of position. If the Blocking Screw Extension Arm was used, turn the wheel counterclockwise to disengage it from the main targeter.

Additionally, all drill guides, sheaths and trocars should be disassembled prior to cleaning and reprocessing.

