ORTHOLOC™ 3Di

Small Bones Plating System

SURGICAL TECHNIQUE

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ORTHOLOC™ 3DI

Small Bones Plating System

SURGICAL
TECHNIQUE

Proper surgical procedures and techniques are the responsibility of the medical professional. The following guidelines are furnished for information purposes only. Each surgeon must evaluate the appropriateness of the procedures based on his or her personal medical training and experience. Prior to use of the system, the surgeon should refer to the product package insert for complete warnings, precautions, indications, contraindications and adverse effects. Package inserts are also available by contacting the manufacturer. Contact information can be found on the back of this surgical technique and the package insert is available on the website listed.

Please contact your local Wright representative for product availability.

Contents

Introduction

The ORTHOLOC™ 3Di Small Bone Plating System marks a new level of surgical flexibility and performance for forefoot fracture and osteotomy fixation. Featuring the innovative ORTHOLOC 3Di polyaxial locking plate technology, this system enables surgeons to address varying fracture patterns with customized screw trajectories, while providing the stability of a locked, fixed angle construct.

System Features

Increased Material Strength*

Versatile, low-profile plate designs are Type II anodized, pairing increased strength with minimal construct prominence

Comprehensive 5th Metatarsal Plating Options

Hook, Hybrid and Jones fracture plates address complete range of proximal 5th metatarsal fractures

Anatomic Fixation

Every 3Di screw hole accepts either a 2.0mm or 2.4mm non-locking or polyaxial locking screw, addressing variations in fracture patterns and patient anatomies

*Data on file

Intended Use

chapter 1

Indications

The ORTHOLOC 3Di Small Bone Plate System is intended for use in the stabilization of fresh fractures, revision procedures, joint fusions, and reconstruction of small bones of the hands, feet, wrists, ankles, fingers, and toes. The system can be used in both adult and pediatric patients. Examples include:

- Metatarsal, metacarpal, or phalangeal fractures and osteotomies
- Lesser metatarsal shortening osteotomies (e.g. Weil)
- Fifth metatarsal fractures (e.g. Jones Fracture)

General Surgical Contraindications

- Active infection
- Possibility for conservative treatment
- Insufficient quantity or quality of bone to permit stabilization of the arthrodesis
- Suspected or documented metal allergy or intolerance

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Device Description

chapter 2

3Di Small Bone Utility Plate Module

The Utility Plate module of the ORTHOLOC 3Di Small Bone System consists of universal Straight and T-Plates designed to address a wide range of lesser metatarsal fractures. Low-profile designs minimize the likelihood of soft-tissue irritation and may be contoured with ease to match the anatomy.

Straight Plate

T-Plate Plate

3Di Small Bone 5th Metatarsal Plate Module

The 5th Metatarsal module features plates designed specifically for proximal 5th metatarsal fractures. Hook plates are designed to capture avulsion fractures, while Y-Plates feature a single tine, potentially allowing for tendon sparing fixation. Jones Fracture plates are anatomically contoured for proximal placement and may be used to address both zone 2 and 3 fractures.

Hook Plate

Y-Plate

Jones Fracture Plate

3Di Small Bone Pinch Plate Module

The Pinch Plate module features plates designed to streamline and maximize fixation of distal lesser metatarsal osteotomies. The barbed Pinch Plate arms allow for controlled, provisional fixation of the metatarsal head that eases reduction techniques and helps maintain proper anatomic alignment as definitive fixation is achieved. Pinch Plates may also be used for fracture fixation.

Pinch Plate

Preoperative Planning

chapter 3

Implant Selection

Plates

After appropriate dissection and reduction of the fracture/osteotomy site has been achieved, choose an ORTHOLOC 3Di Small Bone plate that best achieves the fixation goals specific to the anatomy and indication. | TABLE 1

	Straight Plate	T-Plate	5th Metatarsal Hook Plate	5th Metatarsal Y-Plate	Jones Fracture Plate	Straight Pinch Plates
Plate Shaft Width	5.5mm	5.5mm	6.5mm	5.5mm	6mm	5.5mm
Plate Thickness	1.3mm	1.3mm	1.3mm	1.3mm	1.5mm	1.3mm
Available Lengths	17(x2), 31, 45, 58mm	35, 42, 49mm	42mm	41mm	39, 49mm	27, 37mm
Number of Shaft Holes (Includes Compression Slots)	2, 4, 6, and 8	4, 5, 6	3	3	3	3, 5

Screws

The ORTHOLOC 3Di Locking hole has been designed to accept 2.0mm and 2.4mm ORTHOLOC 3Di locking and non-locking screws. Choose the most appropriate screw diameter and type based on anatomy, bone quality, and surgical goals

2.0mm Locking Screws

- On axis and polyaxial locking capability
- Cortical thread
- 1.3mm Pre-drill
- 8 – 20mm lengths

2.0mm Non-Locking Screws

- On axis and polyaxial capability
- Cortical thread
- 1.3mm Pre-drill
- 8 – 20mm lengths

2.4mm Locking Screws

- On axis and polyaxial locking capability
- Cortical thread
- 1.6mm Pre-drill
- 8 – 30mm lengths

2.4mm Non-Locking Screws

- On axis and polyaxial capability
- Cortical thread
- 1.6mm Pre-drill
- 10 – 30mm lengths

Surgical Procedure

chapter 4

General System Procedures

Color Coding

The ORTHOLOC 3Di Small Bone Plating System features an instrument and implant color coding system designed to increase O.R. efficiency and speed. After choosing the appropriate screw for a given application, select the drill and drill guide with the corresponding color coded markings. | **FIGURE 1**

| **FIGURE 1**

1.3/1.6mm Threaded Drill Guide 52031316

| FIGURE 2

1.3/1.6mm Drill Guide 52030016

| FIGURE 3

Screw Fixation

When using a locking screw on-axis with the plate, thread the appropriate Locking Drill Guide into the 3Di locking hole and use the corresponding drill | **TABLE 1** through the guide to the appropriate depth. | **FIGURE 2** The ORTHOLOC 3Di locking screw can be used at up to 15 degrees off axis to the plate threads. For off axis locking screw insertion, determine the appropriate screw angle and use the non-locking drill guide in the desired plate screw hole. | **FIGURE 3** Screw length is determined by utilizing the depth gauge. | **FIGURE 4**

Screw	Drill	Part Number
2.0mm Locking	1.3mm	52031330
2.0mm Non-Locking	1.3mm	52031330
2.4mm Locking	1.6mm	52031630
2.4mm Non-Locking	1.6mm	52031630

| TABLE 1:
Screw/Drill Refence Guide

| FIGURE 4

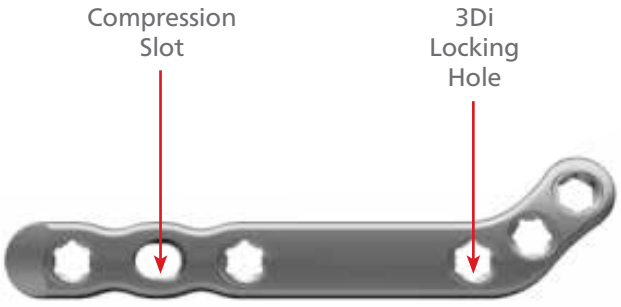
Determining Screw Length

Screw length can also be determined with the drill and drill guides. Use the appropriate drill to penetrate through the near cortex and continue until the far cortex is reached. Stop drilling just as the far cortex of the bone is penetrated and note where the screw length reference on the drill meets the drill guide. | **FIGURE 5** As an alternative, a traditional screw depth gauge has also been provided in the system.

| FIGURE 5

Compression Slots

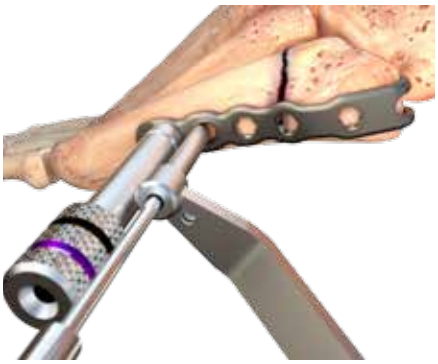
Compression across a fracture, osteotomy, or arthrodesis site can be achieved using the oblong compression slots in selected plates. | **FIGURE 6**



| **FIGURE 6**

Fixate the side of the plate opposite to the compression slot using the appropriate locking or non-locking screw. Using the appropriate pre-drill, drill a hole at the furthest point in the compression slot away from the fracture or osteotomy site, | **FIGURE 7** and drive the appropriate non-locking screw until fully seated in the plate. | **FIGURE 8** Compression across the fracture or osteotomy site is created as the screw travels to the center of the compression slot as the screw is tightened. Additional fixation is recommended after compression is achieved.

CAUTION: Bicortical fixation is recommended for proper use of the compression slot feature.



| **FIGURE 7**

| **FIGURE 8**

Plate Contouring

The ORTHOLOC 3Di Small Bone plates have been designed to match the anatomic contours of the forefoot. In most cases, intraoperative plate contouring will not be necessary. If contouring is required, use the plate bending pliers provided in the system to slightly modify plate contours as needed. | **FIGURE 9** Place the bending pliers in the desired 3Di plate holes and contour the plate to the desired point. Alternatively, threaded in situ plate benders are also provided in the system | **FIGURE 10** for contouring plates while on the bone. Thread the bender into any 3Di locking hole, ensuring full engagement to the plate threads. Lever the bender down, contouring the plate flush to the host bone.

CAUTION: Care should be taken to avoid over-bending or bending in a back-and-forth motion to prevent stress risers.

Plate Bending Pliers	52030713

| FIGURE 9

In-Situ Plate Benders	52030040

| FIGURE 10

NOTE: As an alternative, Locking Drill Guides may also be used for plate bending.

1.1mm K-Wire DSDS1011

5TH Metatarsal Fracture

Surgical Approach

Expose the 5th Metatarsal tuberosity and extend a longitudinal incision distally. Care should be taken to avoid injury to the sural nerve and the peroneus brevis tendon.

Fracture Reduction

Manually reduce the fracture and provisionally fixate using k-wires. **I FIGURE 11**

Plate Selection

The ORTHOLOC 3Di Small Bone Plating system features 3 different 5th metatarsal plate options. **I TABLE 2** Universal 5th Metatarsal Hook Plates feature two sharp tines that are designed to fixate Zone I and II proximal 5th metatarsal fractures. As an alternative, the system also features a hybrid Y-Plate that allows for simultaneous proximal screw and hook fixation. Due to the single hook design, the plate may also help facilitate preservation of the peroneus brevis tendon insertion. The Jones Fracture plate is designed specifically for Zone II and III fractures. The plate features two different lengths to accommodate variations in fracture location and provide graft spanning capability. The Jones Fracture Plate features a thicker 1.5mm profile and is designed to provide additional construct strength.

5th Metatarsal Hook Plate	5th Metatarsal Y-Plate	Jones Fracture Plate
		

| TABLE 2:
5th Metatarsal Plate Options

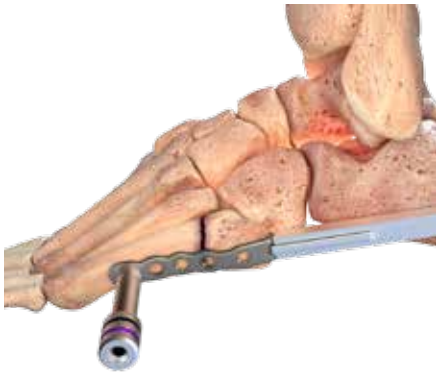
Option 1: 5th Metatarsal Hook and Y-Plates

Hook Plate Impaction

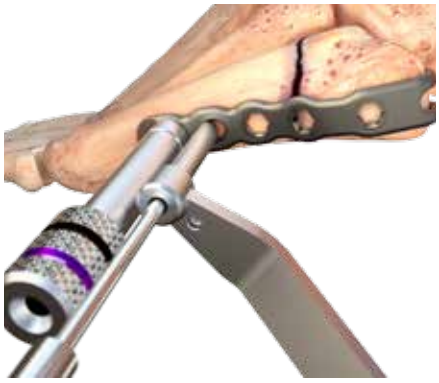
The Hook Impactor is designed to facilitate hook insertion of both the 5th Metatarsal Hook Plate and the 5th Metatarsal Y-Plate. Both plates feature a proximal notch that is designed to accept the distal end of the impactor. Position the plate centered along the longitudinal axis of the 5th metatarsal with the hooks resting on the proximal aspect of the tuberosity. Using light hammer blows, tap the blunt end of the impactor handle and advance the hook or hooks until the plate sits flush to the bone. **I FIGURE 12**

Screw Fixation

Using the techniques described in the screw fixation section of this guide, place locking and/or non-locking screws through all 3Di locking plate holes. **| FIGURE 13** It is recommended to fill the distal compression slot prior to filling the 3Di locking screw holes (see compression slots guide section). This will ensure that compression across the fracture line is maximized prior to achieving locking fixation.



| FIGURE 12



| FIGURE 13

IMPORTANT NOTE: Applying pressure to the impactor handle prior to drilling for and inserting the compression screw will help maximize reduction/compression.

Optional HR Screw Placement

In instances where the most proximal screw whole is unable to be filled due to close proximity to the fracture, a 2.0 or 2.4mm non-locking screw may be inserted through the proximal plate notch and across the fracture. **I FIGURE 14**

| FIGURE 14

1.1mm Temporary Fixation Pin DC4212

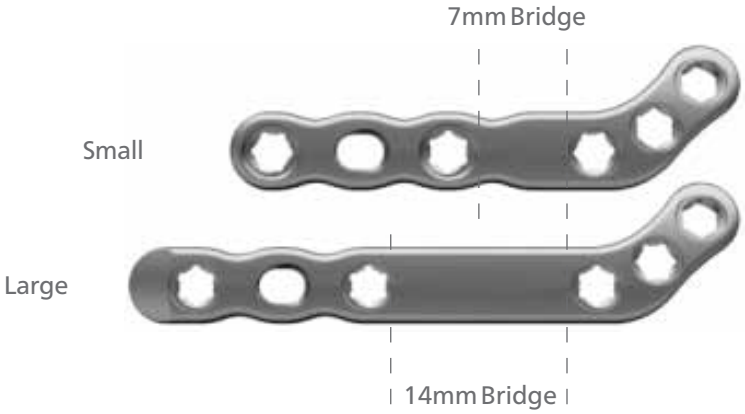
| FIGURE 16

Option 2: Jones Fracture Plate

Provisional Plate Placement

Dependent upon the fracture location, select either the Small or Large Jones Fracture Plate. The Large Jones Fracture Plate features a longer bridge, which will allow the plate to span more distal fractures or bone graft. **I FIGURE 15**

Temporary fixation of the plate can be achieved by inserting the 1.1mm temporary fixation pins into any of the ORTHOLOC 3Di locking holes. **| FIGURE 16**



| FIGURE 15

Screw Fixation

Using the techniques described in the screw fixation section of this guide, place locking and/or non-locking screws through all 3Di locking plate holes. **| FIGURES 17 and 18** It is recommended that proximal fixation is achieved first. The distal compression slot should then be used (see compression slots guide section) followed by filling the distal locking holes.

| FIGURE 17

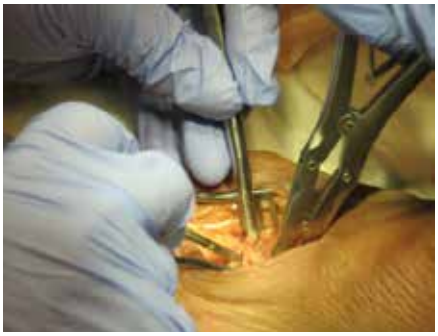
| FIGURE 18

IMPORTANT NOTE: 2.4mm locking and non-locking screws are recommended when using the Jones Fracture Plate

Lesser Metatarsal Shortening

Surgical Approach

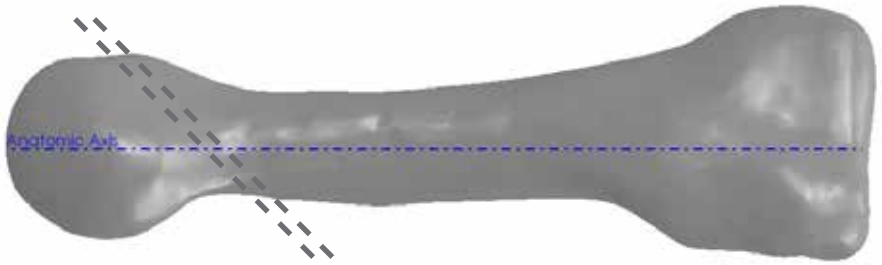
The metatarsal head is approached through a dorsal incision, with the exposure extending distally to the metatarsophalangeal joint and proximally such that it facilitates plate placement. Place the plate onto the metatarsal bone before making the osteotomy. Contour the plate/arms and remodel the bone as needed to assure proper fit and determine the osteotomy location. Remove the plate so the osteotomy can be made **I FIGURE 19**



| FIGURE 19

Osteotomy

The osteotomy is made with a saw, and should begin 4 to 6mm proximal to the articular cartilage. The cut is made approximately 60° dorsal to the long axis of the metatarsal. **I FIGURE 20** Two parallel cuts should be made to remove a segment of bone to achieve the desired shortening.



| FIGURE 20

Metaphyseal Segmental Shortening Osteotomy (+/- 2mm of bone removal)

Plate Selection

The ORTHOLOC 3Di Small Bone Plating System features Pinch Plates designed to streamline and maximize fixation of distal lesser metatarsal osteotomies. **I FIGURE 21** Pinch Plates facilitate fixation of pure metatarsal segmental shortening osteotomies and allow for osteotomies in a location of increased blood supply. The barbed Pinch Plate arms allow for controlled, provisional fixation of the metatarsal head that eases reduction techniques and helps maintain proper anatomic alignment as definitive fixation is achieved.

| FIGURE 21

Plate Placement

The Pinch Plate should be positioned dorsally, with its arms positioned approximately 2mm proximal to the articular surface of the metatarsal head. **I FIGURE 22** In most instances, manual depression of the plate will drive the arms around the metatarsal head and the plate to the bone. Attaching the locking drill guide to the distal hole can also facilitate plate application. If needed, plate arms may be bent to accommodate the anatomy by using the plate bending forceps.

IMPORTANT NOTE: Remodeling of the metatarsal head with a rongeur may be needed to facilitate the fit of the armed end of the plate to the metatarsal head.

| FIGURE 22

Screw Fixation

Using the techniques described in the screw fixation section of this guide, place the distal locking screw first, then the proximal compression slot should be used (see compression slots guide section). This will ensure that compression across the osteotomy or fracture line is maximized prior to achieving definitive fixation. The proximal locking holes should then be filled. **I FIGURES 23 and 24**

| FIGURE 23

| FIGURE 24

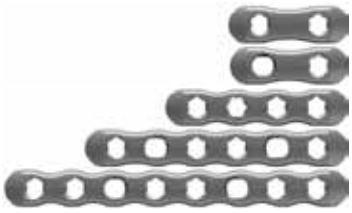
Explant Information

Removal of the plate may be performed by first extracting the plate screws using the STAR 7 Straight Driver (5202000016) and then removing the plate from the bone.

If the removal of the implant is required due to revision or failure of the device, the surgeon should contact the manufacturer using the contact information located on the back cover of this surgical technique to receive instructions for returning the explanted device to the manufacturer for investigation.

Ordering Information

Hook Plate



Straight Plates

T-Plates

Pinch Plates

Plates

Part Number	Part Descriptions	Qty
52020400	5TH MET HOOK PLATE	1
5202500L	5TH MET Y-PLATE LEFT	1
5202500R	5TH MET Y-PLATE RIGHT	1
52020301	2 HOLE/WITH COMP	2
52020302	2 HOLE STRAIGHT PLATE	2
52020304	4 HOLE STRAIGHT PLATE	2
52020306	6 HOLE STRAIGHT PLATE	2
52020308	8 HOLE STRAIGHT PLATE	2
52020206	6 HOLE T-PLATE	2
52020207	7 HOLE T-PLATE	2
52020208	8 HOLE T-PLATE	2
52020211	4 HOLE STRAIGHT PINCH PLATE	1
52020212	6 HOLE STRAIGHT PINCH PLATE	1

Ordering Information

Screws

Part Number	Part Descriptions	Qty
5201020008	TI LOCK SCREW 2.0 X 8MM	2
5201020010	TI LOCK SCREW 2.0 X 10MM	6
5201020012	TI LOCK SCREW 2.0 X 12MM	6
5201020014	TI LOCK SCREW 2.0 X 14MM	4
5201020016	TI LOCK SCREW 2.0 X 16MM	2
5201020018	TI LOCK SCREW 2.0 X 18MM	2
5201020020	TI LOCK SCREW 2.0 X 20MM	2
5201120008	TI NON LOCK SCREW 2.0 X 8MM	2
5201120010	TI NON LOCK SCREW 2.0 X 10MM	4
5201120012	TI NON LOCK SCREW 2.0 X 12MM	4
5201120014	TI NON LOCK SCREW 2.0 X 14MM	4
5201120016	TI NON LOCK SCREW 2.0 X 16MM	2
5201120018	TI NON LOCK SCREW 2.0 X 18MM	2
5201120020	TI NON LOCK SCREW 2.0 X 20MM	2
5201024008	TI LOCK SCREW 2.4 X 8MM	2
5201024010	TI LOCK SCREW 2.4 X 10MM	6
5201024012	TI LOCK SCREW 2.4 X 12MM	6
5201024014	TI LOCK SCREW 2.4 X 14MM	6
5201024016	TI LOCK SCREW 2.4 X 16MM	6
5201024018	TI LOCK SCREW 2.4 X 18MM	4
5201024020	TI LOCK SCREW 2.4 X 20MM	4
5201024022	TI LOCK SCREW 2.4 X 22MM	2
5201024024	TI LOCK SCREW 2.4 X 24MM	2
5201024026	TI LOCK SCREW 2.4 X 26MM	2
5201024028	TI LOCK SCREW 2.4 X 28MM	2
5201024030	TI LOCK SCREW 2.4 X 30MM	2
5201124008	TI NON LOCK SCREW 2.4 X 8MM	2
5201124010	TI NON LOCK SCREW 2.4 X 10MM	4
5201124012	TI NON LOCK SCREW 2.4 X 12MM	4
5201124014	TI NON LOCK SCREW 2.4 X 14MM	4
5201124016	TI NON LOCK SCREW 2.4 X 16MM	4
5201124018	TI NON LOCK SCREW 2.4 X 18MM	4
5201124020	TI NON LOCK SCREW 2.4 X 20MM	2

Ordering Information

5201124022	TI NON LOCK SCREW 2.4 X 22MM	2
5201124024	TI NON LOCK SCREW 2.4 X 24MM	2
5201124026	TI NON LOCK SCREW 2.4 X 26MM	2
5201124028	TI NON LOCK SCREW 2.4 X 28MM	2
5201124030	TI NON LOCK SCREW 2.4 X 30MM	2

Ordering Information

Instruments/Consumables

Part Number	Part Descriptions	Qty
DC4212	TEMP FIXATION PIN 1.1MM	4
DSDS1011	K-WIRE 1.1X150MM BLUNT/TROCAR	4
52030016	1.3/1.6MM DRILL GUIDE	1
52031316	1.3/1.6MM THREADED DRILL GUIDE	2
52030040	IN SITU PLATE BENDER	2
52032024	2.0/2.4MM DRILL GUIDE	1
52031330	DRILL BIT 1.3MM	2
52031630	DRILL BIT 1.6MM	2
52032030	2.0MM DRILL BIT	1
52032430	2.4MM DRILL BIT	1
52030030	DEPTH GAGE	1
52030050	5TH MET HOOK PLATE IMPACTOR	1
52030617	POINTED BONE CLAMP	1
52030715	6" LOBSTER CLAMP	1
52030618	HOHMANN RETRACTOR	1
52030619	PERIOSTEAL ELEVATOR	1
52030713	PLATE BENDING PLIERS	2
52030607	2.0/2.4MM COUNTERSINK	1
DC4197	FORCEPS ANGLED TIP	1
24900019	LOCON-T® QUICK CONNECT	1
41112017	AO QUICK CONNECT CANNULATED	1
5202000008	BONE FRAGMENT PICK	1
5202000002	SCREW 2.0/2.4 GRIPPER	1
5202000016	DRIVER STAR 7	2
49510102	SELF RETAINING DRIVER	2

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