

# DOUBLE/TRIPLE PELVIC OSTEOTOMY PLATES

For Treating Coxofemoral Joint Instability  
and Subluxation in Immature Dogs



# TABLE OF CONTENTS

---

INTRODUCTION	Double/Triple Pelvic Osteotomy Plates	2
	AO Principles	5
	Indication	6
<hr/>		
SURGICAL TECHNIQUE	Performing the Osteotomy	7
	Plate Positioning	8
	Drill Guide Technique	9
	Screw Insertion Technique	10
<hr/>		
PRODUCT INFORMATION	Implants	12
	Instruments	14
	Set Information	16

# DOUBLE/TRIPLE PELVIC OSTEOTOMY PLATES

The DePuy Synthes Vet\* Double/Triple Pelvic Osteotomy (DPO/TPO) plate is part of a stainless steel plate and screw system that merges locking screw technology with conventional plating techniques. The DPO/TPO plate has many similarities to existing bone fixation plates, with a few important improvements. The technical innovation of locking screws and an anatomical contour provide the ability to create a fixed-angle construct while following familiar AO plating principles.

**Features:**

- Available in right and left versions
- Uses either conventional or locking screws
- Contoured for anatomic fit
- Screw trajectory is designed to optimize screw purchase
- 20°, 25°, or 30° option



## PLATE DESIGN

### Screw Holes

The *DePuy Synthes Vet* DPO/TPO plate is designed with two distinct screw-hole technologies to accommodate all plating modalities. The plate includes three stacked Combi™ holes on the caudal side, and three stacked Combi holes and one locking compression plate (LCP)® Combi hole on the cranial side.

The stacked Combi hole in the plate accepts either cortex or locking screws. If locking screws are to be used in conjunction with cortex screws on the same side of the plate, the cortex screws must be inserted and tightened first, before any locking screws are inserted. If cortex screws are used, the plate must be appropriately contoured to the bone to ensure good bone plate contact.

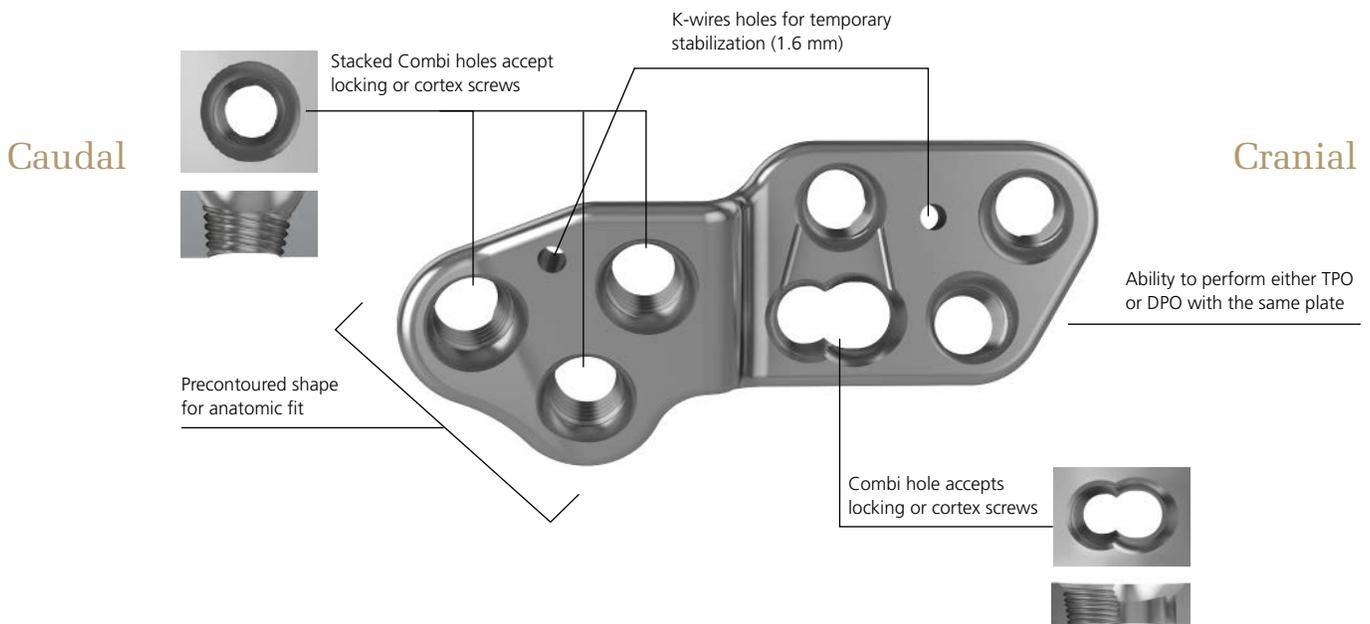
The LCP Combi hole accepts either cortex screws or locking screws. The cortex screw should be placed in the unthreaded portion of the Combi hole in either a loaded or neutral position. Alternatively, a locking screw may be used in the threaded portion of the Combi hole when indicated.

### Fixed-angle Stability

The threads on the head of the locking screws lock into the threaded plate holes to form a fixed-angle construct that will increase load transfer between the plate and bone. When compared to conventional plate-and-screw constructs, the angular and axial stability of locking screws increases the strength of the construct under load without requiring precise anatomical contouring.

### Anatomical Contour

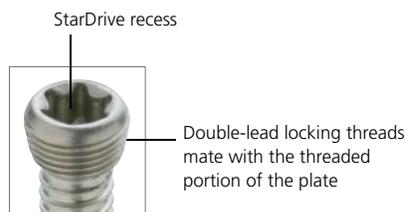
The anatomically shaped DPO/TPO plate is contoured to match the ilial shaft and to allow clearance for acetabular flare and the tuberosity for the rectis femoris muscle origin.



## LOCKING SCREWS

### Screw Head

The tapered, double-lead machine thread on the head of the locking screw engages the threads of the locking plate holes. The resulting fixed-angle construct provides stable fixation of the bone fragments without having to compress the plate to the bone. A perfectly contoured plate is therefore not required to achieve fixation and maintain proper alignment.



### Thread Profile

Because locking screws do not compress the plate to the bone, the "pull-out" mode of failure is not applicable to locking screws. For this reason, locking screws are made with a smaller thread profile and a larger core diameter. This results in increased mechanical strength over comparably sized cortex screws<sup>1</sup>.



### Drive Mechanism

The StarDrive recess of a locking screw provides three significant improvements over an internal hex drive. First, "stripping" of the screw head is minimized as a failure mode, which results in a much higher tolerance to wear for the screwdriver<sup>1</sup>. Second, the tapered StarDrive recess provides automatic screw retention without the need for an additional screw holding mechanism. Third, the more efficient StarDrive recess allows a smaller screw head and allows the screw head to sit flush with the plate.

**Caution:** *DePuy Synthes Companies of Johnson & Johnson* implants and instruments are manufactured with proprietary processes that produce superior products to those created by conventional manufacturing processes. Though other companies may be able to estimate the *DePuy Synthes Companies* general product design, *DePuy Synthes Companies* product dimensions are proprietary. The precision design of *DePuy Synthes Companies* products is very important for long-term product function and optimal fit between implants.

Only the finest quality materials are used to manufacture *DePuy Synthes Companies* implants. The metals *DePuy Synthes Companies* uses have been scientifically proven to be of the best biocompatibility and quality available today.

With these features and qualities, the mixing of *DePuy Synthes Companies* implants with the implants from other companies is not recommended. The overall performance may be compromised due to differences in design, chemical composition, mechanical properties, and quality.

Given these qualities are trade-secret, no competitor of *DePuy Synthes Companies* can make a genuine claim "the same as *DePuy Synthes Companies*." Combining implants from other companies with *DePuy Synthes Companies* implants could reduce product performance. Consequently, it is strongly recommended to not mix parts from different manufacturers.

<sup>1</sup>Test data on file at DePuy Synthes.

# AO PRINCIPLES

---

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.<sup>1,2</sup> They are:

## **Anatomic Reduction**

Fracture reduction and fixation to restore anatomical relationships.

## **Stable Fixation**

Stability by fixation or splintage, as the personality of the fracture and the injury requires.

## **Preservation of Blood Supply**

Preservation of the blood supply to soft tissue and bone by careful handling.

## **Early, Safe Mobilization**

Early, safe mobilization of the part and patient

1. Müller ME, Allgöwer M, Schneider R, Willenegger H. *Manual of Internal Fixation: Techniques Recommended by the AO-ASIF Group*. 3rd ed. Berlin: Springer-Verlag; 1991.

2. Rüedi TP, Buckley RE, Moran CG (eds). *AO Principles of Fracture Management*. 2nd ed. Stuttgart, New York: Thieme. 2007.

# INDICATIONS

---

The *DePuy Synthes Vet* DPO/TPO plate is intended for treatment of coxofemoral joint instability and subluxation in immature dogs prior to onset of osteoarthritis.

**Note:** Avoid use in patients with preexisting conditions which could compromise the strength of the pelvic bone. DPO should be avoided in patients less than 5 months old and TPO should be avoided in patients less than 6 months old.

# PERFORMING THE OSTEOTOMY

The following technique describes a DPO procedure. The plate placement and insertion will be the same for both a DPO and a TPO. The surgeon should select the appropriate procedure based on indication and experience.

## 1

### Perform Osteotomy

#### Instrument(s)

532.110	Small Battery Drive II
532.021	Sagittal Saw Attachment
532.065	Saw Blade, 14 mm width, 50 mm length

Perform pubis and ilium osteotomies per standard DPO procedure. Elevate the caudal ilial shaft bone segment and overlap it on the cranial segment.

**Note: When performing the osteotomies, take care to avoid injury to the sciatic and obturator nerves.**



# PLATE POSITIONING

---

## 2

### Position Plate

Align the ventral aspect of the caudal segment of the ilial shaft and center the plate to optimize placement of the screws in the more robust bone of the ilial shaft.

Contour the plate as needed to match the natural curvature of the ilium. Plate contouring will alter the trajectory of the locking screws.

Apply caudal pressure when attaching the plate to the face of the caudal segment osteotomy to ensure placement of screws at a maximum distance from the osteotomy. This pressure should be maintained when inserting screws. A K-wire can be used for temporary fixation of the plate to the bone.

**Note: When inserting implants, take care to avoid damage to the sciatic and obturator nerves.**



# DRILL GUIDE TECHNIQUE

---

## Threaded Drill Guide

---

### Instrument(s)

---

312.648      2.8 mm Threaded Drill Guide,  
for 3.5 mm locking screws

---



When a locking screw is placed, a threaded drill guide must be used for guiding the drill bit in the proper direction.

**Note:** The threaded drill guide can also be used intraoperatively as a reference for visualizing the angle at which the locking screws will be directed into the bone.

## Universal Drill Guide

---

### Instrument(s)

---

323.36      3.5 mm Universal Drill Guide

---



The universal drill guide is used to place conventional screws in a neutral position or load position in the LCP Combi Hole. If the screw is intended to achieve interfragmentary compression, the universal drill guide should be placed in the load position, as shown and described in the figure below. If the screw is not used to provide interfragmentary compression, the universal drill guide should be placed in the neutral position.

### Compression (load position)

Compression is achieved by placing the universal drill guide in the eccentric position, and maintaining the drill guide body above the plate as shown.

### Neutral position

Neutral position is achieved by placing the universal drill guide in the eccentric position, then compressing the drill guide body into the plate hole, which will shift the drill guide into the neutral position as shown.



# SCREW INSERTION TECHNIQUE

Refer to the *DePuy Synthes Vet Small Fragment Technique Guide* for correct screw insertion techniques.

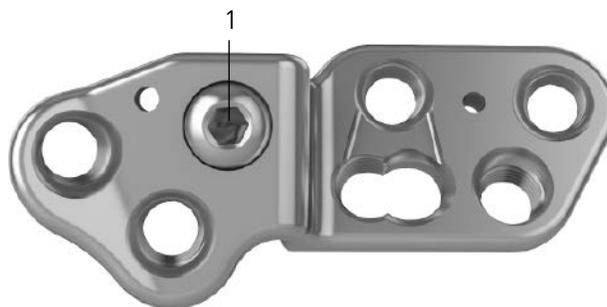
## 3 Screw Insertion Order

The following technique is shown using the 3.5 mm DPO/TPO plate. It is recommended that screws be inserted in the sequence described below:

**Note: When using self-tapping screws, 2-3mm can be added to the length to maximize thread purchase on the transcortex.**

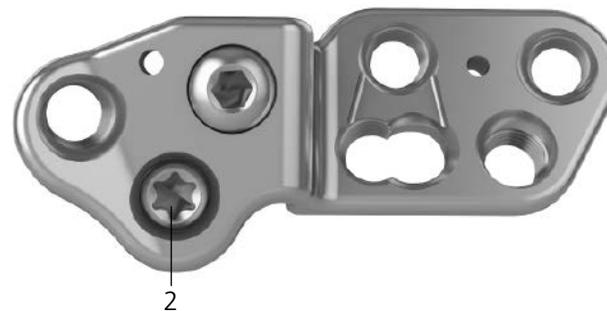
### 3a

Ensure the plate is held firmly against the osteotomy by applying caudally directed pressure and insert a cortex screw in hole 1. This hole is angled slightly caudally away from the osteotomy to draw the plate to the bone when tightened, and to maximize the distance between the hole and the osteotomy.



### 3b

Place a locking screw in hole 2 and fully tighten.



### 3c

If a K-wire was used for temporary fixation in the caudal segment, it can be removed. Insert a locking screw in hole 3 and fully tighten.



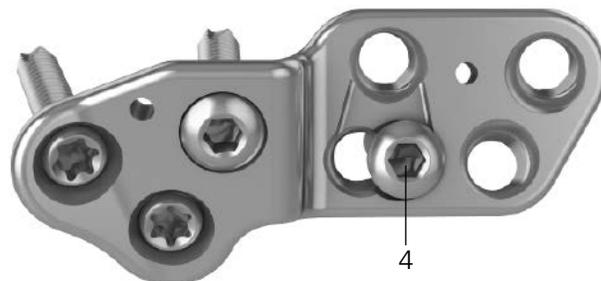
### 3d

Rotate the caudal ilial segment with the threaded plate holder and/or pelvic forceps. The rotational force required may be substantial depending on the age and size of the patient. The pressure on the instrument used for rotation should be maintained until the first screw is tightened to reduce the chance of stripping the screw hole.

Compress the plate against the ilial wing while also compressing the osteotomy. Compression of the osteotomy maintains the rotation, increases stability and speeds healing.

Insert a cortex screw in load position in hole 4 and compress the plate to the ilial wing. This will simultaneously further compress the osteotomy.

If the cortex screw hole strips, the screw can be replaced with a locking screw once the plate is fully secured.



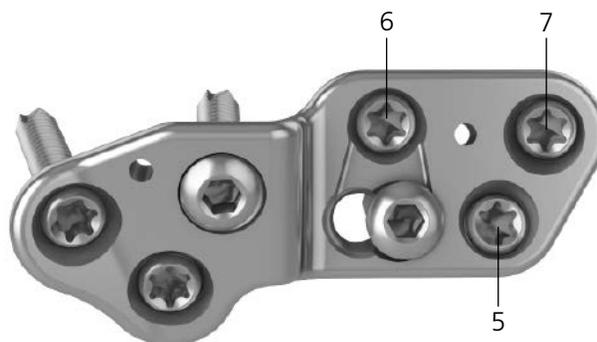
### 3e

Insert the remaining screws holes 5, 6 and 7 and tighten fully. Screws can be placed in any order, based on surgeon's preference.

An additional cortex screw may be used to compress the plate against the ilium. It is recommended that at least 2 locking screws are used in the cranial segment due to the soft nature of the bone and the large loads placed on the screws.

**Note: All screws must be fully tightened for proper function. Avoid over-tightening cortex screws as this may result in stripping the bone. Do not lock the screws to the plate under power. It is recommended that screw head thread engagement and final locking torque should be performed manually.**

**For 3.5 mm Locking Screws, 511.773 Torque Limiting Attachment, 1.5 Nm, quick coupling can be used. Screws inserted with the Torque Limiting Adapter should be checked by hand to ensure they are fully tightened.**



# IMPLANTS

3.5 mm DPO/TPO Plate, 44 mm long,  
3.2 mm thick

VP4601.L7	20°, Left
VP4601.R7	20°, Right
VP4602.L7	25°, Left
VP4602.R7	25°, Right
VP4603.L7	30°, Left
VP4603.R7	30°, Right



**3.5 mm Locking Screws, self-tapping, with StarDrive recess**

- VS303.010– 10 mm–40 mm (in 2 mm increments)
- VS303.040
- VS303.045– 45 mm–70 mm (in 5 mm increments)
- VS303.070



**3.5 mm Cortex Screws, self-tapping**

- VS302.010– 10 mm–50 mm (in 2 mm increments)
- VS302.050
- VS302.055– 55 mm–70 mm (in 5 mm increments)
- VS302.070



**Also available**

**3.5 mm Cortex Screws, non-self-tapping**

- VS301.010– 10 mm–50 mm (in 2 mm increments)
- VS301.040
- VS301.045– 45 mm–70 mm (in 5 mm increments)
- VS301.070



**Screw Reference Chart**

Thread Diameter	3.5 mm	3.5 mm
Screw Type	Cortex	Locking
Drill Bit for Threaded Hole	2.5 mm	2.8 mm
Tap	3.5 mm	Self-Tapping
Drive Type	2.5 mm Hexagonal	T15 StarDrive

# INSTRUMENTS

---

310.25      2.5 mm Drill Bit, quick coupling, 110 mm



---

310.288      2.8 mm Drill Bit, quick coupling, 165 mm



---

312.648      2.8 mm Threaded Drill Guide



---

314.115      StarDrive Screwdriver, T15



---

314.116      StarDrive Screwdriver Shaft, T15,  
quick coupling



---

323.36      3.5 mm Universal Drill Guide



# ALSO AVAILABLE

VW1603.15 1.6 mm Kirschner Wire with trocar point, 150 mm



511.773 Torque Limiting Attachment, 1.5 Nm, quick coupling  
–For use with 3.5 mm locking screws



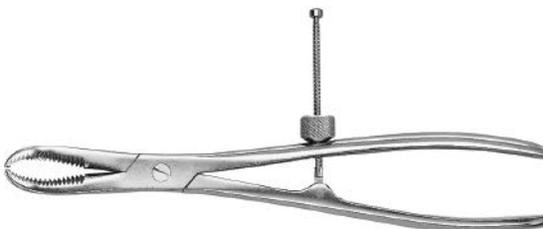
324.023 Threaded Plate Holder



398.74 Small Pelvic Forceps



399.06 Reduction Forceps, 180 mm, Speed lock



## Small Battery Drive II Accessories

05.001.204 Universal Battery Charger II

05.001.250 AO/ASIF Quick Coupling for Drill Bits

532.104 Battery Insertion Shield

532.110 Small Battery Drive II

532.022 Quick Coupling for K-wires

532.132 Battery Casing for 14.4 V Li Ion Battery

532.021 Sagittal Saw Attachment

532.103 14.4 V Li Ion Battery for Small Battery Drive II

532.065 Saw Blade, 14 mm width, 50 mm length

For the full range of attachments and accessories for the Small Battery Drive II, please contact your *DePuy Synthes Vet* representative or consult the *DePuy Synthes Power Tools* product catalog.

# SET INFORMATION

---

## Recommended Sets

- 103.503 Small Fragment Instrument Set, Veterinary
- 103.515 Small Fragment Screw Set, Veterinary

**Note:** Small Fragment Instrument Set (103.503) consists of Standard Instrument Set (103.501), with graphic case, and Locking Instrument Set (103.502).



103.503



103.515

For detailed cleaning and sterilization instructions, please refer to:  
[www.synthes.com/cleaning-sterilization](http://www.synthes.com/cleaning-sterilization)  
In Canada, the cleaning and sterilization instructions will be provided with the Loaner shipments.

**Limited Warranty and Disclaimer:** DePuy Synthes Vet products are sold with a limited warranty to the original purchaser against defects in workmanship and materials. Any other express or implied warranties, including warranties of merchantability or fitness, are hereby disclaimed.

**WARNING:** In the USA, this product has labeling limitations. See package insert for complete information.

**CAUTION:** USA Law restricts these devices to sale by or on the order of a physician.

Not all products are currently available in all markets.



COMPANIES OF *Johnson & Johnson*

**DePuy Synthes Vet**  
1302 Wrights Lane East  
West Chester, PA 19380  
Telephone: (610) 719-5000  
To order: (800) 523-0322

[www.synthesvet.com](http://www.synthesvet.com)

\*DePuy Synthes Vet, a division of DePuy Orthopaedics, Inc.

© DePuy Synthes Vet, a division of DOI 2014. All rights reserved.  
DSUS/VET/0614/0006 7/14