

MINI TIBIAL PLATEAU LEVELING OSTEOTOMY (TPLO) SYSTEM

For stabilizing osteotomies of the
canine and feline proximal tibia

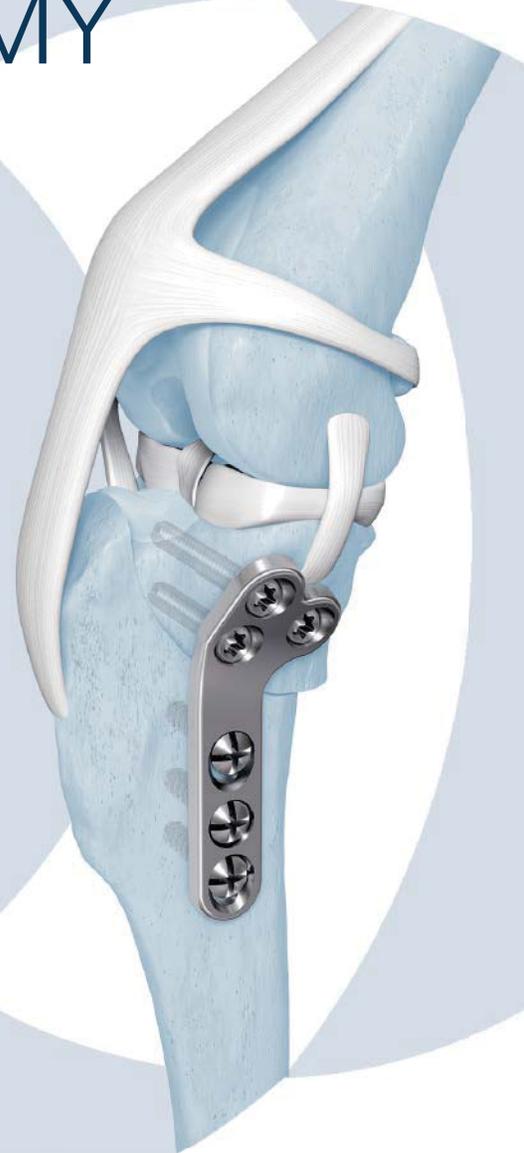


TABLE OF CONTENTS

INTRODUCTION	Mini Tibial Plateau Leveling Osteotomy (TPLO) System	2
	Implant Features	6
	TPLO Saw Blades	6
	AO Principles	7
	Indications	7
	Clinical Cases	8

SURGICAL TECHNIQUE	Plate Contouring and Positioning	9
	Drill Guide Technique	10
	Jig Pin/Saw Guide Technique	12
	Screw Insertion Sequence	17

PRODUCT INFORMATION	Implants	20
	Instruments	24
	Set Information	26
	TPLO Rotation Reference Chart	27

MINI TIBIAL PLATEAU LEVELING OSTEOTOMY (TPLO) SYSTEM

For Stabilizing Osteotomies of the Canine and Feline Proximal Tibia

SYSTEM OVERVIEW

The DePuy Synthes Mini Tibial Plateau Leveling Osteotomy (TPLO) System merges locking screw technology with conventional plating techniques. The Mini TPLO 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.

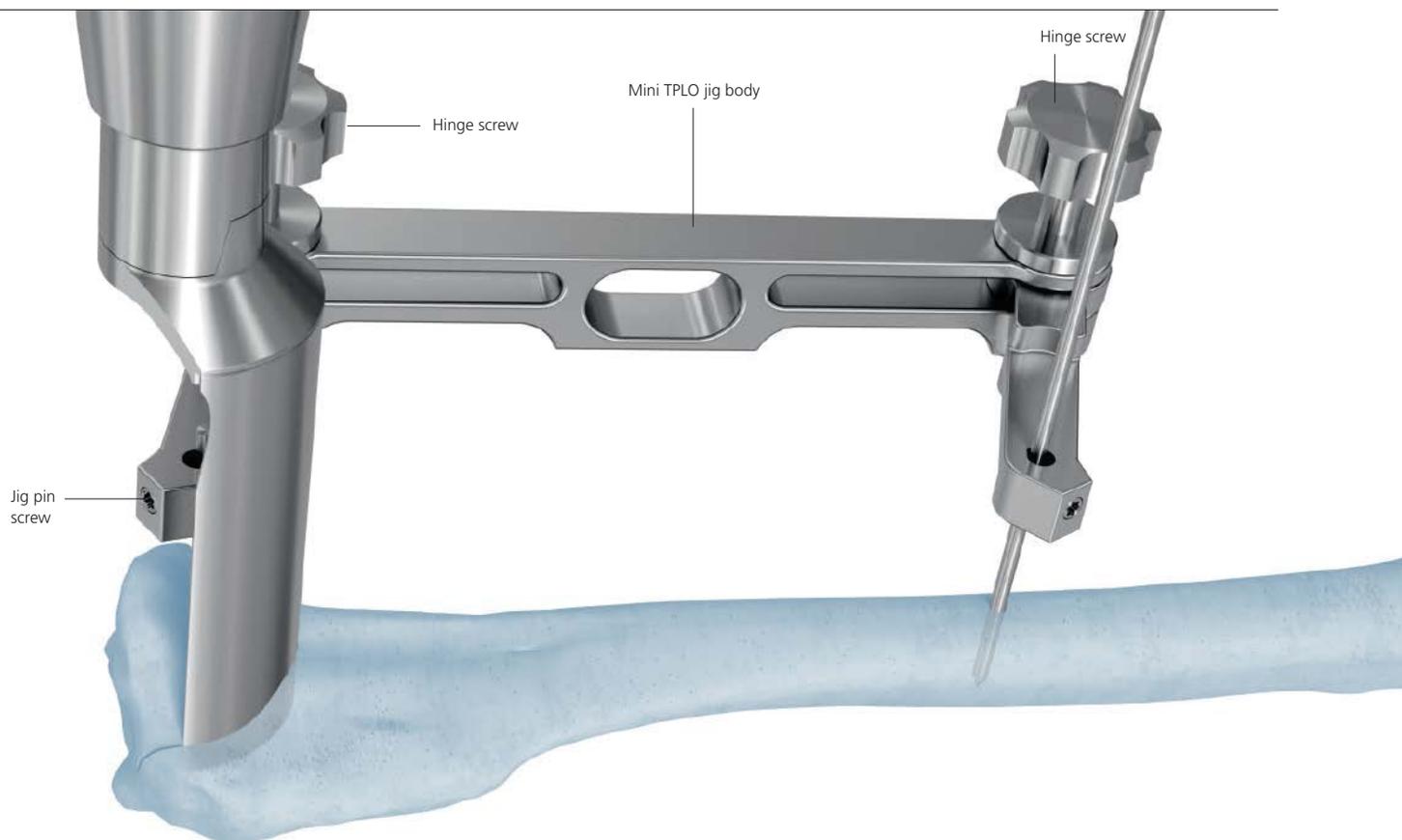
For information on the 2.7 mm, 3.5 mm small, 3.5 mm and 3.5 mm broad TPLO plates, please refer to the DePuy Synthes Vet Standard Tibial Plateau Leveling Osteotomy (TPLO) System Technique Guide.

Features

- Available in 2.0 mm and 2.4 mm sizes
- Available in right and left versions
- Accepts either cortex or locking screws
- Precontoured for anatomic fit
- Plate head specifically designed to facilitate adequate screw purchase in the proximal bone segment
- Screw trajectory in head holes is designed to minimize likelihood of penetrating articular surface and osteotomy
- Implants are made of implant-quality 316L stainless steel



MINI TPLO JIG



Mini TPLO Jig Features

- Versatile positioning to accommodate a broad spectrum of patient anatomies
- Maintains stability and limb alignment
- Vibration-resistant hinge screws eliminate loosening and are easily tightened by hand
- Hardened steel jig pin screws resist stripping
- Attaches to bone with a 1.6 mm–2.5 mm pin
- Easy disassembly for removal and cleaning
- 45° Jig pin screw orientation for easier access to head holes of TPLO plate



Jig pin screws are tightened using a T6 StarDrive

IMPLANT FEATURES

PLATE DESIGN

Holes

The DePuy Synthes Vet Mini TPLO plate is designed with two distinct screw-hole technologies to accommodate all plating modalities. Along its shaft are two dynamic compression plate (DCP) holes separated by one stacked Combi hole; in its head are three stacked Combi holes.

The DCP holes accept cortex screws that may be placed in either loaded or neutral positions, depending on whether or not interfragmentary compression is desired (see Universal Drill Guide for more detail).

Stacked Combi holes accept either cortex or locking screws. If locking screws are to be used in conjunction with cortex screws in the plate head, 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.

Limited-Contact Shaft Design

The limited-contact shaft design reduces plate-to-bone contact area and helps to preserve vascularity and optimize bone healing.

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.

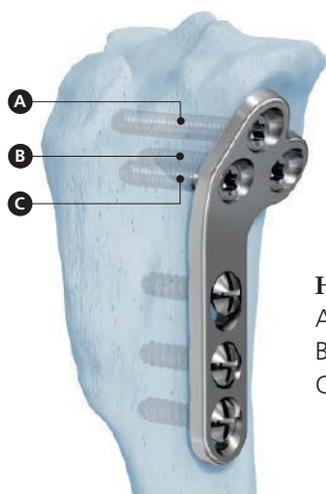
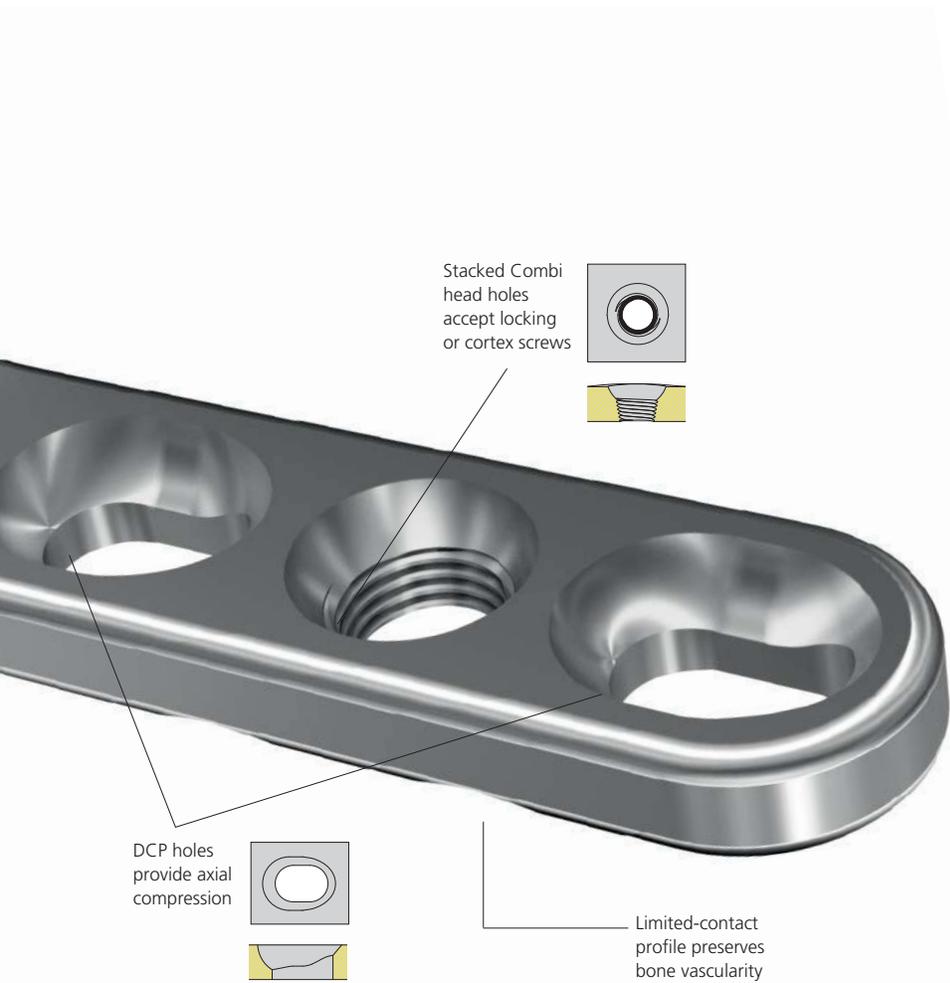
Angled threaded holes in the head of the TPLO plate help ensure that screws are angled away from the articular surface.

Anatomical Contour

The anatomically shaped TPLO matches the medial aspect of the proximal tibia. This can reduce or eliminate the need for additional shaping of the plate.



LOCKING SCREWS



Head Screw Angulations

- A. Proximal screw: 2° distal/2° caudal
- B. Cranial screw: 2° caudal
- C. Caudal screw: 2° cranial

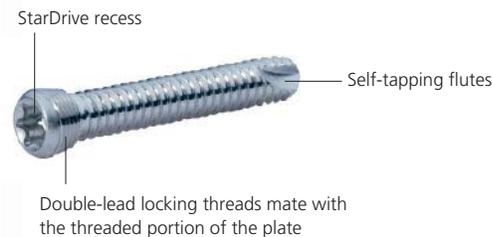
Screw Head

The tapered, double-lead machine thread on the head of the locking screw engages the threads of the locking 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 stable 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. This results in increased mechanical strength over comparably sized cortex bone screws.

Note: The locking screws are self-tapping.



Drive Mechanism

The StarDrive recess of a locking screw provides three significant improvements over an internal hex or cruciform 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. 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 flush fitting to the plate.

All implants are made of implant-quality 316L stainless steel.

TPLO SAW BLADES

Large Oscillating Saw Attachment and Saw Blades

- Specially designed saw attachment for tibial plateau leveling osteotomies
- Seven saw blades, with radii ranging from 12 mm–30 mm
- Simple and stable connection of the saw blade into the saw attachment
- Thin saw blades offer excellent cutting performance and minimal bone removal (cutting thickness is 0.6 mm)
- Compatible with Small Battery Drive II System



AO PRINCIPLES

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.¹ 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 and gentle reduction techniques.

Early, Active Mobilization

Early, safe mobilization of the part and patient.



INDICATIONS

The DePuy Synthes Mini Tibial Plateau Leveling Osteotomy (TPLO) Plate System is intended for use in stabilizing osteotomies of 10 mm–15 mm of the canine and feline proximal tibia.

1. Johnson AL, Houlton J, Vannini R. *AO Principles of Fracture Management in the Dog and Cat*. Stuttgart: Thieme; 2005.

CLINICAL CASE

2.4 mm TPLO Plate

A 9-year-old male Havanese presented with a partial tear of the CrCL.

The use of 3 locking screws in the 2.4 mm plate head ensures optimal stabilization of the proximal portion of the tibia. The distal portion of the tibia is stabilized using cortex screws in the plate shaft.



Preoperative Lateral



Postoperative Lateral



Preoperative AP



Postoperative AP

PLATE CONTOURING AND POSITIONING

Plate Contouring

If only locking screws are used in the plate head, contouring of the plate is generally not required. The distal section must be pressed firmly to the diaphysis as standard screws are used to secure this position of the plate. Some plate contouring to the shaft may be necessary to ensure the plate is flush with the bone.

If cortex screws are used in the plate head, the following precautions are necessary:

1. Because cortex screws pull the bone to the plate, contouring of the plate is required to ensure plate contact with bone.
2. If cortex screws are used in combination with locking screws, cortex screws must be inserted and fully tightened prior to inserting locking screw(s).

Note:

Contouring of the plate may redirect the angle of the locking screws. It is best to avoid contouring around the head holes as this can distort the internal threads.

Plate Positioning

The Mini Tibial Plateau Leveling Osteotomy (TPLO) plate should be positioned on the medial surface of the tibia in a manner that best fits the bone contour and osteotomy. The plate is designed to be placed very proximally, just distal to the articular surface. The proximal head screw is angled 2° distal/2° caudal, away from the articular surface.



DRILL GUIDE TECHNIQUE

Threaded Drill Guide

Instruments

03.111.010 1.5 mm LCP Solid Threaded Drill Guide,
for 2.0 mm locking screws

03.111.011 1.8 mm LCP Solid Threaded Drill Guide,
for 2.4 mm locking screws

The 1.5 mm threaded drill guides fit the threaded holes of the 2.0 mm TPLO plates. The 1.8 mm threaded drill guides fit the threaded holes of the 2.4 mm TPLO plates.

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

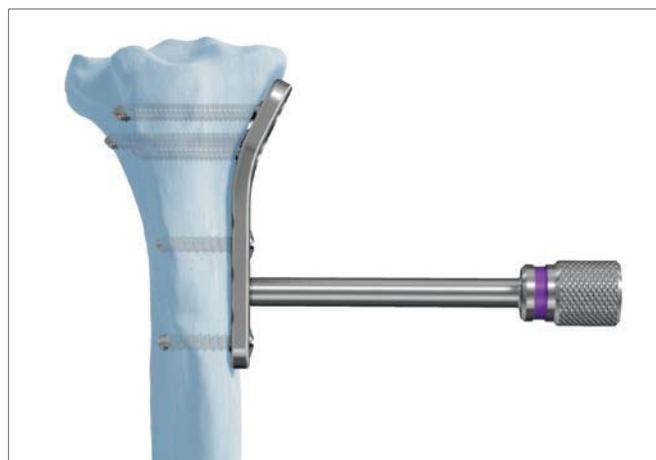
Note: The threaded drill guide can also be used intraoperatively as a reference for visualizing the angle at which the locking screws will engage the bone.



03.111.010



03.111.011



DRILL GUIDE TECHNIQUE

Universal Drill Guide

Instruments

323.201 2.0 mm Universal Drill Guide

323.202 2.4 mm Universal Drill Guide

The universal drill guide is used to place cortex screws in neutral position or load position. 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 to the right. If the screw is not used to provide interfragmentary compression, the universal drill guide should be placed in the neutral position.

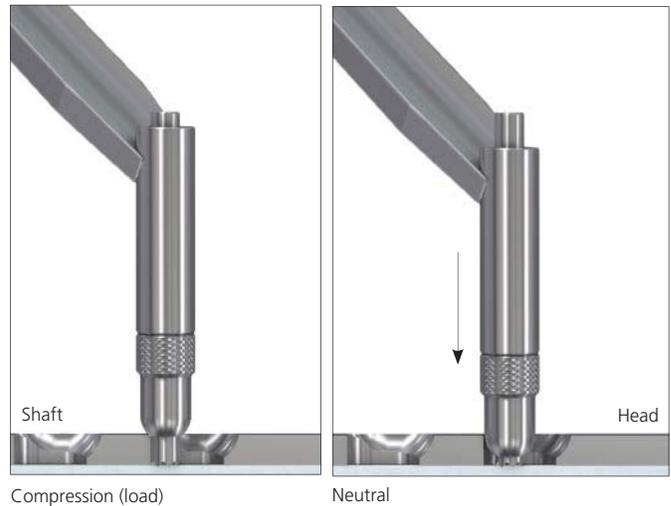
Compression (load) Position

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 hole, which will shift the drill guide into the neutral position as shown.

Note: For illustrative purposes, a DCP hole has been depicted. The same methodology applies to LC-DCP and Combi holes.



JIG PIN/SAW GUIDE TECHNIQUE

1

Insert Proximal Jig Pin

Instruments

VQ0002.00	Mini TPLO Jig
VW1603.15	1.6 mm Kirschner Wire
VW2003.15	2.0 mm Kirschner Wire
VW2503.15	2.5 mm Kirschner Wire

Make a standard medial approach to the proximal tibia. Identify the medial collateral ligament (MCL).

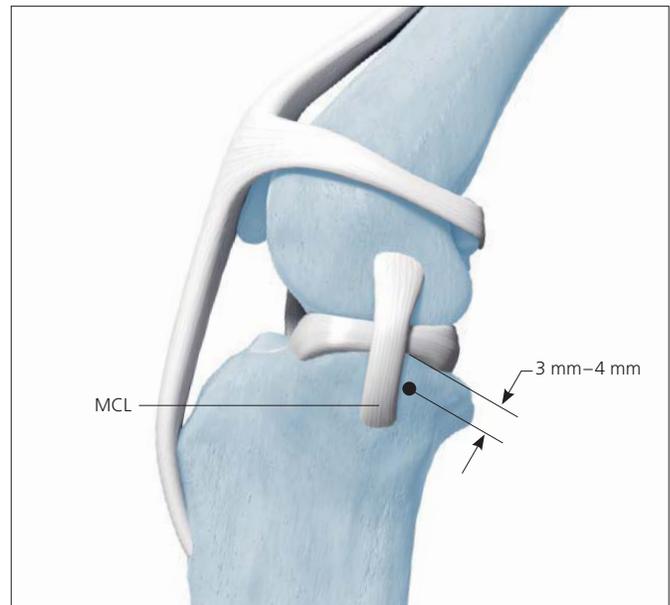
Place a 1.6 mm–2.5 mm K-wire (jig pin), as a jig pin through the proximal jig pin hole in the arm of the jig.

Ensure the hole is clear by rotating the jig pin screw counterclockwise. The screw does not need to be completely removed.

Insert the jig pin 3 mm–4 mm distal to the joint surface and just caudal to the medial collateral ligament.

It is important to ensure the jig pin is inserted parallel to the articular surface and frontal plane of the tibia and perpendicular to the sagittal plane.

Do not tighten the proximal jig pin screw until after the distal jig pin is inserted.



2

Insert Distal Jig Pin

Instruments

VW1603.15	1.6 mm Kirschner Wire
VW2003.15	2.0 mm Kirschner Wire
VW2503.15	2.5 mm Kirschner Wire
311.01	Handle, with Mini Quick Coupling
313.843	StarDrive Screwdriver Shaft, T6

Place a 1.6 mm–2.5 mm K-wire jig pin through the distal jig pin hole in the arm of the jig.

Insert the pin ensuring it is parallel to the proximal jig pin and centered in the tibia.

Tighten the jig pin screws with the T6 StarDrive screwdriver shaft and handle.



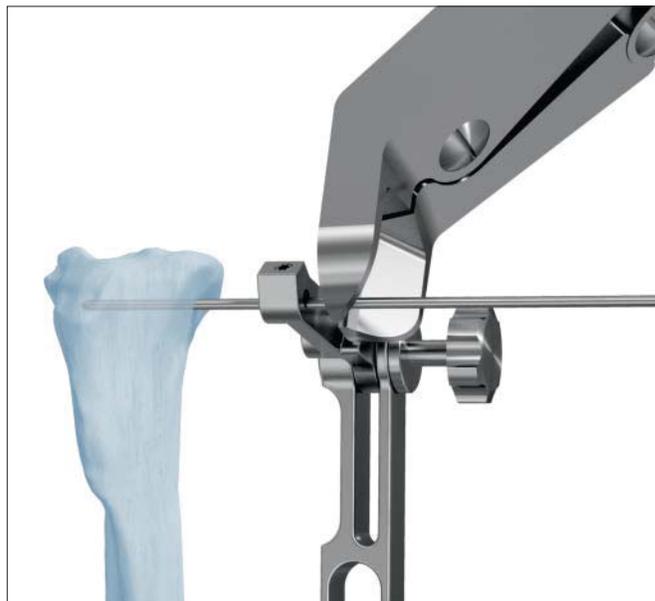
3

Cut Proximal Jig Pin

Instrument

391.93	Wire Cutter
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To provide clearance for the saw blade, cut the proximal jig pin leaving 3 mm–5 mm protruding above the jig.



4
Perform Osteotomy

Instruments

	Crescentic Saw Blades, 45 mm x 0.6 mm*
03.000.390	12 mm radius
03.000.391	15 mm radius
	Osteotomes, 150 mm length
399.80	2 mm width
399.81	5 mm width
399.82	10 mm width
532.110	Small Battery Drive II
532.026	Oscillating Saw Attachment, large

Perform a partial osteotomy of the proximal tibia. The cut is made approximately halfway through the bone. Care must be taken to ensure the cut is made parallel to the distal jig pin.

Place a mark on the proximal bone fragment near the edge of the osteotomy. This mark should be located cranial to the midpoint of the osteotomy.

Make a second mark on the proximal bone fragment at the proper distance from the first mark. This distance should be determined from the Mini TPLO Rotation Quick Reference Chart on page 27.

Transfer the second mark across the cut to the distal bone fragment.

Complete the osteotomy.



*A 10 mm blade may be used per the pre-operative plan.

5

Rotate Proximal Bone Fragment

Instruments

	Kirshner Wires
VW1003.15	1.0 mm
VW1203.15	1.25 mm
VW1603.15	1.6 mm
VW2503.15	2.5 mm

Insert a 2.5 mm K-wire (pin) into the proximal bone fragment at an oblique angle, above the level of the patellar tendon insertion. Orient the pin to avoid the articular surface and osteotomy and aim just below the jig pin while ensuring penetration into the far cortex.

Rotate the proximal bone fragment to align the marks.

Notes:

- **Do not attempt to align the medial surfaces of the bone**
- **A small step can be expected**

Secure the tibial plateau segment in rotated position by inserting a 1.0 mm or 1.25 mm K-wire beginning proximo-lateral to the patellar tendon insertion on the tibial tuberosity and through the tibial plateau segment. This K-wire should be aimed just distal to the jig pin.

Remove the larger K-wire (pin) used for rotation.

Technique Tip: Application of a pointed reduction forcep from the tibial tuberosity to the caudal margin of the tibial plateau provides additional stability of the osteotomy.



6

Contour Plate (optional)

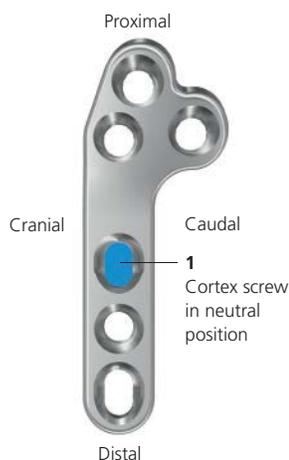
Place the plate on the bone and contour it as required (if using conventional screws). Observe precautions described on page 9 when contouring the plate.

SCREW INSERTION SEQUENCE

The following technique is shown using the 2.4 mm TPLO plate. The same procedure should be used for the 2.0 mm TPLO plate. It is recommended that screws be inserted in the sequence described below:

1

In the proximal DCP shaft hole, place a cortex screw in neutral position.



2

In the most distal DCP shaft hole, place a cortex screw in the load position. This screw should be left slightly loose, until it makes initial contact with the plate/DCP hole. If the head of the screw engages the DCP hole an undesirable proximal shift of the plate may occur.

Note: When rotational correction is performed, this screw should be placed in neutral position.



3

Place either a cortex screw or locking screw in the most cranial head hole of the plate. Fully tighten this screw. If this hole is not accessible, place either a cortex or locking screw in the hole that can be most easily accessed, avoiding the jig and holding wire. If both cortex and locking screws are used in the plate head, place and tighten all cortex screws first and then place all locking screws.

Observe precautions described on page 9 when contouring the plate when using cortex screws.

Note: Do not lock the screws to the plate under power. Screw head-thread engagement and final locking torque must be performed manually.

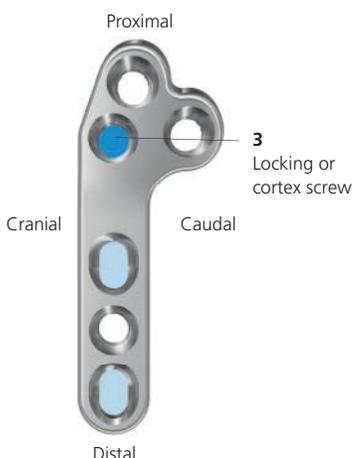
The following Torque Limiting Attachments are indicated for their respective Mini TPLO Systems:

For 2.0 mm Locking Screws

511.777 Torque Limiting Attachment,
0.4 Nm, quick coupling

For 2.4 mm Locking Screws

511.776 Torque Limiting Attachment,
0.8 Nm, quick coupling



4

Place a second cortex screw or locking screw in the head of the plate. Select the screw hole that can be most easily accessed, avoiding the jig and holding K-wire.

Articulate the jig arms if necessary to gain access to a plate hole. The jig should remain in place until at least two screws have been inserted into the head of the plate.

Fully tighten this screw.



*See p. 24 for the 0.4 Nm and 0.8 Nm Torque Limiting Attachment.

SCREW INSERTION SEQUENCE

5

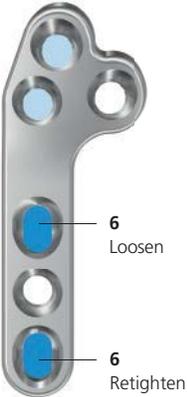
Tighten the most distal shaft screw until it makes initial contact with the plate/DCP hole.



6

Slightly loosen the screw in the proximal DCP hole.

Fully tighten the most distal DCP shaft hole to apply compression across the osteotomy.



7

Retighten the screw in the proximal DCP shaft hole.

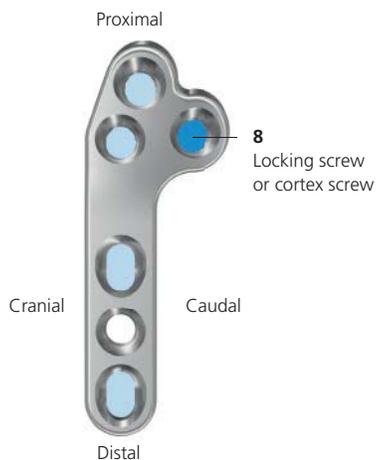


8

Remove Jig

Place either a cortex screw or locking screw in the last head hole of the plate. Fully tighten this screw.

Note: It is highly recommended that at least two locking screws be used in the proximal, head portion of the TPLO Plate (Steps 3, 4, and 8).



9

Place either a cortex screw or a locking screw in the stacked Combi-hole in the shaft. Fully tighten this screw.

Check tightness of screws placed previously.



IMPLANTS

2.0 mm Tibial Plateau Leveling Osteotomy (TPLO) Plate,
30 mm long, 2.3 mm thick

	Proximal Holes	Distal Holes	
VP4405.L3	3	3	left
VP4405.R3	3	3	right



2.4 mm Tibial Plateau Leveling Osteotomy (TPLO) Plate,
35 mm long, 2.3 mm thick

	Proximal Holes	Distal Holes	
VP4404.L3	3	3	left
VP4404.R3	3	3	right



2.0 mm Cortex Screws

VS201.006– 6 mm–40 mm (in 2 mm increments)
 VS201.040



2.0 mm Cortex Screws, self-tapping

VS202.006– 6 mm–40 mm (in 2 mm increments)
 VS202.040

2.0 mm Locking Screws, self-tapping, with StarDrive recess

VS207.006– 6 mm–14 mm (in 1 mm increments)
 VS207.014



VS207.016– 16 mm–30 mm (in 2 mm increments)
 VS207.030

2.4 mm Cortex Screws, self-tapping

VS203.006– 6 mm–14 mm (in 1 mm increments)
 VS203.014



VS203.016– 16 mm–40 mm (in 2 mm increments)
 VS203.040

2.4 mm Locking Screws, self-tapping, with StarDrive recess

VS208.006– 6 mm–14 mm (in 1 mm increments)
 VS208.014



VS208.016– 16 mm–30 mm (in 2 mm increments)
 VS208.030

Screw Reference Chart

Thread Diameter	2.0 mm	2.0 mm	2.4 mm	2.4 mm
Screw Type	Cortex	Locking	Cortex	Locking
Drill Bit for Threaded Hole	1.5 mm	1.5 mm	1.8 mm	1.8 mm
Tap	2.0 mm	Self-Tapping	Self-Tapping	Self-Tapping
Drive Type	1.5 mm/2.0 mm Cruciform	T6 StarDrive	2.4 mm Cruciform	T8 StarDrive

INSTRUMENTS FOR LOCKING SCREWS

310.16 1.5 mm Drill Bit, Quick Coupling, 110 mm



310.510 1.8 mm Drill Bit, Quick Coupling, 100 mm



03.111.010 1.5 mm LCP Solid Threaded Drill Guide, for 2.0 mm locking screws



03.111.011 1.8 mm LCP Solid Threaded Drill Guide, for 2.4 mm locking screws



313.843 StarDrive Screwdriver Shaft, T6



314.467 StarDrive Screwdriver Shaft, T8



323.201 2.0 mm Universal Drill Guide



323.202 2.4 mm Universal Drill Guide



INSTRUMENTS

VQ0002.00 Mini TPLO Jig



VQ0002.04 Replacement Jig Pin Screw



311.01 Handle, with Mini Quick Coupling



311.43 Handle, with Quick Coupling



ALSO AVAILABLE

391.93 Wire Cutter



399.80 Osteotomes, 150 mm length
2 mm width
399.81 5 mm width
399.82 10 mm width



511.776 Torque Limiting Attachment, Quick Coupling, 0.8 Nm



511.777 Torque Limiting Attachment, Quick Coupling, 0.4 Nm



Kirschner Wires
VW1003.15 1.0 mm
VW1203.15 1.25 mm
VW1603.15 1.6 mm
VW2003.15 2.0 mm
VW2503.15 2.5 mm



Small Battery Drive II and Accessories

- 05.001.204 Universal Battery Charger II
- 532.104 Battery Insertion Shield
- 532.010 Small Battery Drive II
- 532.026 Oscillating Saw Attachment, large
- 532.027 Replacement Key, for 532.026
- 532.132 Battery Casing for 14.4 V Li Ion Battery
- 532.103 14.4 V Li Ion Battery for Small Battery Drive

Crescentic Saw Blades

- 03.000.390 12 mm radius, 45 mm x 0.6 mm for Large Oscillating Saw Attachment
- 03.000.391 15 mm radius, 45 mm x 0.6 mm for Large Oscillating Saw Attachment

Note: All saw blades come with attachment screws.



532.026



531.027



03.000.390



03.000.391

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

SET INFORMATION

Recommended Sets

- 103.521 Mini Fragment Instrument Set, Veterinary
- 103.524 Mini Fragment Implant Set, Veterinary

Note: Mini Fragment Instrument Set (103.521) consists of Standard Instrument Set (103.522), with graphic case, and Locking Instrument Set (103.523)



103.521



103.524

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

Add "S" to product number to indicate sterile product.

TPLO ROTATION

Quick Reference Chart



PREOPERATIVE TIBIAL PLATEAU ANGLE (TPA)

15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Saw Radius	12 mm	2.0	2.2	2.4	2.6	2.9	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5
	15 mm	2.6	2.8	3.1	3.3	3.6	3.8	4.1	4.3	4.6	4.9	5.1	5.4	5.6

PREOPERATIVE TIBIAL PLATEAU ANGLE (TPA)

28°	29°	30°	31°	32°	33°	34°	35°	36°	37°	38°	39°	40°
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Saw Radius	12 mm	4.7	4.9	5.1	5.3	5.5	5.7	5.9	6.1	6.3	6.4	6.6	6.8	7.0
	15 mm	5.9	6.1	6.4	6.6	6.9	7.1	7.4	7.6	7.9	8.1	8.4	8.6	8.8

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.



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