

For the treatment of physeal fractures of the proximal tibia in foals

LCP T-Plate 4.5 mm

Surgical Technique



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LCP T-Plate® 4.5 mm

For the treatment of proximal tibia fractures in foals.

The DePuy Synthes Vet 4.5 mm LCP® T-Plate is part of a stainless steel plate and screw system that merges locking screw technology with conventional plating techniques. The technical innovation of locking screws provides the ability to create a fixed-angle construct while following standard AO plating principles.

Features

- Proximal screws converge to maximize screw purchase in bone.
- Uses locking or cortex screws
- Compatible with Large Fragment System

Plate Design

Screw Holes

All holes accept 5.0 mm locking screws, 4.5 mm cortex screws or 5.5 mm cortex screws.

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.



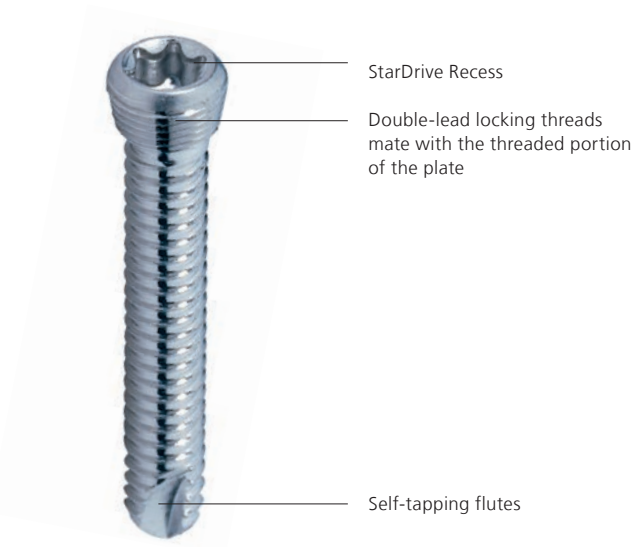
Locking Screws

Screwhead

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.*



Drive mechanism

The STARDRIVE™ Recess of a locking screw provides three significant improvements over an internal hex drive:

- “Stripping” of the screw head is minimized as a failure mode, which results in a much higher tolerance to wear for the screwdriver.*
- The tapered STARDRIVE Recess provides automatic screw retention without the need for an additional screw holding mechanism.
- 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.

* Test data on file at DePuy Synthes Vet (Ref. Reports #SETSET_20110610, MT01-258)

AO Principles

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.^{1,2}

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 4.5 mm LCP T-Plate is intended for treatment of physeal fractures of the proximal tibia in foals.

Plate Contouring and Positioning

1. Position Plate

Instrument

329.300	Bending Press, length 400 mm
511.701	Compact Air Drive II
511.791	Quick Coupling for Kirschner Wires Ø 0.6 to 3.2 mm, for Compact Air Drive and Power Drive
VW2003.15.10	Veterinary: Kirschner Wire Ø 2.0 mm with trocar tip, length 150 mm, Stainless steel, pack of 10 units
311.449	Instrument for temporary reduction for LCP 4.5/5.0
03.100.049	Veterinary: Bending Template for LC-DCP 5.5 and LCP 5.5, length 296 mm



Figure 1

1a.

Reduce the fracture. If a tension band is to be used to assist the reduction, ensure that there is sufficient room to allow placement of the head of the plate on the epiphysis.

1b.

Contour the plate as needed. Screw position in the tibial epiphysis must be considered when contouring of the plate.

Note: Please be aware that contouring the head of the plate changes the locking screw trajectories (maximal screw lengths that can be used without the screws interfering with each other). This may also occur inadvertently when the shaft of the plate is contoured near the head of the plate or if the head of the plate is placed in the bending press.

See Figure 1.

In addition, the vertical alignment of the head of the plate must allow for locking screws to be placed in the epiphysis, avoiding the joint and physis.

See Figure 2.

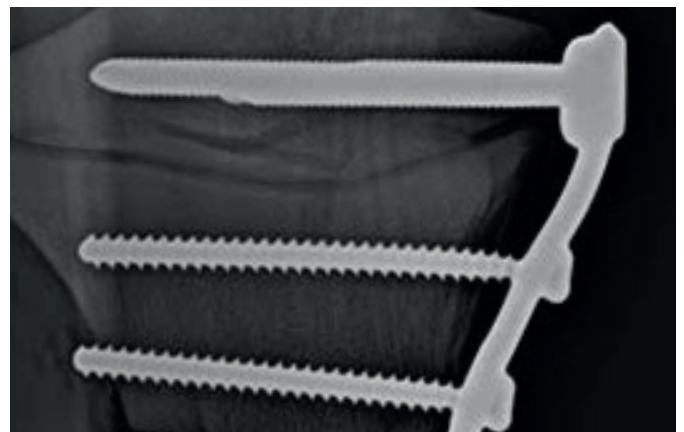


Figure 2

1c.

Place the caudal hole in the head of the plate adjacent to the collateral ligament. If needed, the plate can be clamped into position or temporarily secured using 2.0 mm Kirschner wires.

1d.

Insert the Push-Pull Reduction Device into the center proximal hole and secure the plate to the bone. See Figure 3.

Note: A threaded drill guide inserted into one of the proximal holes can be used to hold the plate during placement and clamping.

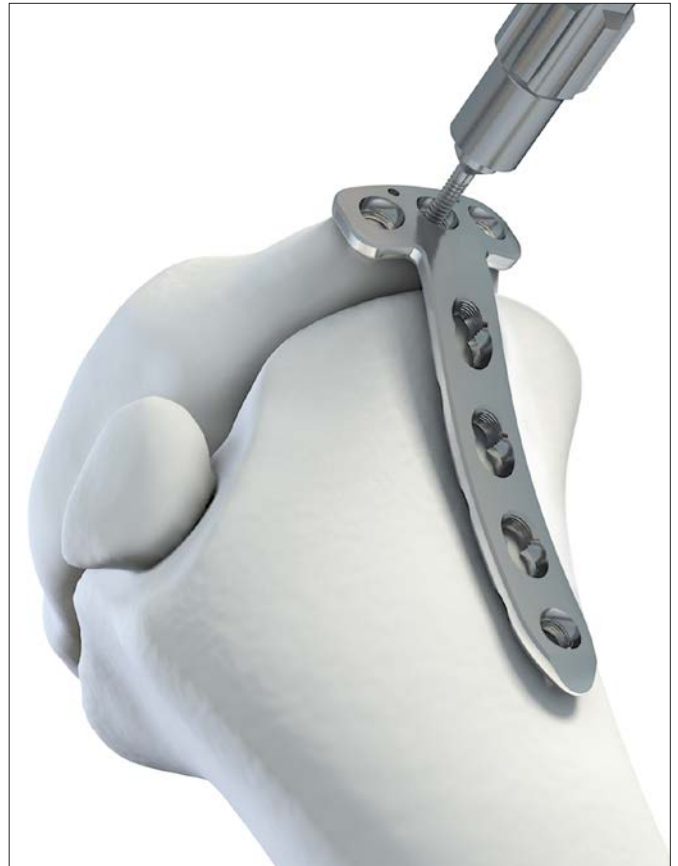


Figure 3

Screw Insertion Technique

2. Screw Insertion

Refer to the DePuy Synthes Veterinary Large Fragment Surgical Technique DSEM/VET/0915/0005 for correct screw insertion techniques.

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 perform final tightening of the screws to the plate under power. It is recommended that final tightening should be performed manually.

For 5.0 mm Locking Screws, 511.771 Torque Limiter, 4 Nm, can be used. Screws inserted with the Torque Limiter should be checked by hand to ensure they are fully tightened.

2a.

Insert a 5.0 mm locking screw into the caudal hole (A) using standard screw insertion technique. If locking fixation is not desired, a 4.5 mm or 5.5 mm cortex screw should be inserted.

Ensure that the screw engages the epiphysis and does not enter the joint or physis.

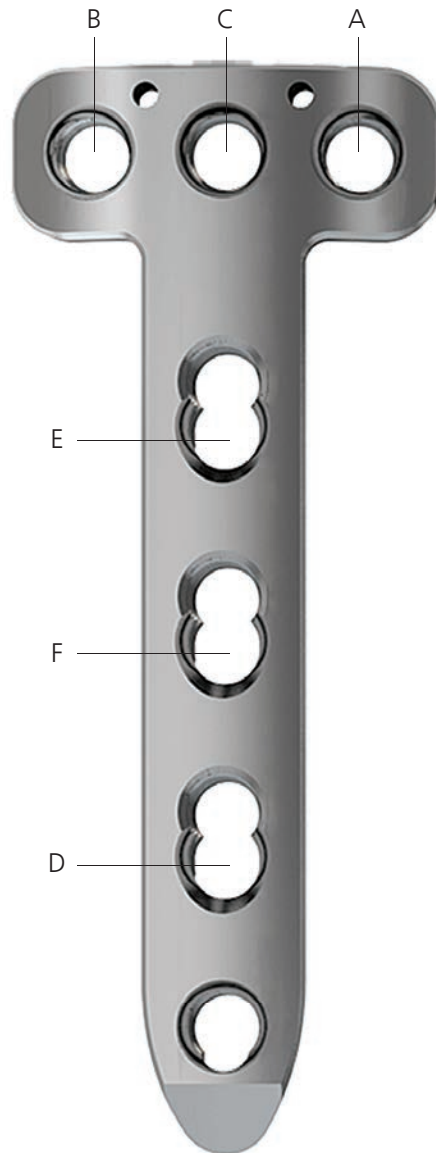
2b.

Insert a locking (or cortex) screw into the cranial proximal hole (B) using the standard screw insertion technique.

If Kirschner wires were placed, they can be removed at this time.

2c.

Remove the push/pull device from the center proximal hole (C) and replace with a screw.



2d.

Place a 5.5 mm cortex screw into the most distal Combi-hole (D) in the load position and tighten fully to compress the fracture.

2e.

Place cortex screws into holes E and F.

The screws should be parallel to the locking screw in hole A to avoid entering the physis. The screws in holes E and/or F may be used in a lag fashion to secure the lateral metaphyseal fragment.

2f.

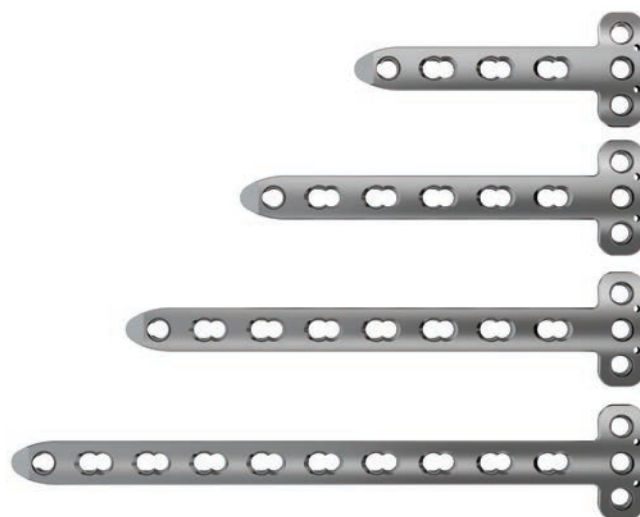
Insert a 5.0 mm locking screw into the remaining hole. For longer plates, insert 5.0 mm locking screws into all remaining holes.



Implants

LCP T-plate 4.5 mm Shaft Holes Length (mm)

VP4353.04	4	91
VP4353.06	6	127
VP4353.08	8	163
VP4353.10	10	199



Cortex Screw Ø 5.5 mm, Stainless Steel

VS501.024– VS501.060	24 mm–60 mm (in 2 mm increments)
VS501.064	64 mm
VS501.070– VS501.100	70 mm–100 mm (in 10 mm increments)



Cortex Screw Ø 4.5 mm, self-tapping, Stainless Steel

VS402.014– VS402.072	14 mm–72 mm (in 2 mm increments)
VS402.076	76 mm
VS402.080– VS402.100	80 mm–100 mm (in 5 mm increments)



Locking Screw Stardrive Ø 5.0 mm, self-tapping, T25, Stainless Steel

VS502.014– VS502.050	14 mm–50 mm (in 2 mm increments)
VS502.055– VS501.090	55 mm–90 mm (in 5 mm increments)



Also Available

Cortex Screw \varnothing 4.5 mm, Stainless Steel

VS401.014– 14 mm–72 mm (in 2 mm increments)
VS401.072

VS401.076 76 mm

VS401.080– 80 mm–100 mm (in 5 mm increments)
VS401.100

Thread Diameter	5.5 mm	4.5 mm	5.0 mm
Screw Type	Cortex	Cortex	Locking
Drill Bit for Threaded Hole	4.0 mm	3.2 mm	4.3 mm
Tap	5.5 mm	4.5 mm	Self-Tapping
Drive Type	3.5 mm Hexagonal	3.5 mm Hexagonal	T25 Stardrive

Instruments

Large Fragment Standard Instrument Set (103.531)

Graphic Case

690.542 Graphic Case for Large Fragment Instrument Set

Instruments

310.290	Drill Bit Ø 3.2 mm, length 195/170 mm, 2-flute, for Quick Coupling
310.400	Drill Bit Ø 4.0 mm, length 197/170 mm, 2-flute, for Quick Coupling
310.480	Drill Bit Ø 4.5 mm, length 195/170 mm, 2-flute, for Quick Coupling
310.550	Drill Bit Ø 5.5 mm, extra-long, length 197/170 mm, 2-flute, for Quick Coupling
310.990	Countersink, large, length 180 mm, for Cortex Screws Ø 4.5 mm
311.440	T-Handle with Quick Coupling
311.480	Tap for Cortex Screws Ø 4.5 mm, length 180/110 mm
311.550	Tap for Cortex Screws 5.5 mm
311.660	Tap for Cancellous Bone Screws Ø 6.5 mm, length 195 mm
312.460	Double Drill Guide 4.5/3.2
312.560	Double Drill Guide 5.5/4.0
314.110	Holding Sleeve, large
314.150	Screwdriver Shaft, hexagonal, large, Ø 3.5 mm
314.270	Screwdriver, hexagonal, large, Ø 3.5 mm, with Groove, length 245 mm
319.100	Depth Gauge for Screws Ø 4.5 to 6.5 mm, measuring range up to 110 mm
321.120	Tension Device, articulated, span 20 mm
321.200	Ratchet Wrench for Nut, hexagonal, 11.0 mm
322.535	Universal Drill Guide 5.5
323.460	Universal Drill Guide 4.5/3.2, for neutral and load position



Also Available

310.310	Drill Bit Ø 3.2 mm, length 145/120 mm, 2-flute, for Quick Coupling
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310.440	Drill Bit Ø 4.5 mm, length 145/120 mm, 2-flute, for Quick Coupling
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Note: Large Fragment Instrument Set (103.530) consists of Large Fragment Standard Instrument Set (103.531), with graphic case, and Large Fragment Locking Instrument Set (103.532).

Large Fragment Locking Instrument Set (103.532)

Instruments

310.431 Drill Bit Ø 4.3 mm, length 180 mm, for Quick Coupling



311.449 Instrument for temporary reduction for LCP 4.5/5.0



312.449 Threaded Drill Guide 4.3



314.118 Screwdriver Stardrive, T25, self-holding, length 290 mm



314.119 Screwdriver Shaft Stardrive 4.5/5.0, T25, self-holding, for AO/ASIF Quick Coupling



397.705 Handle for Torque Limiter Nos. 511.770 and 511.771



511.771 Torque Limiter, 4 Nm, for Compact Air Drive and Power Drive



Also Available

312.445 Drill Sleeve 3.2, curved

324.075 Plate Holder, curved

397.705 Handle for Torque Limiter Nos. 511.770 and 511.771

511.774 Torque Limiter, 4 Nm, for AO/ASIF Quick Coupling for Reamers

Note: Large Fragment Instrument Set (103.530) consists of Large Fragment Standard Instrument Set (103.531), with graphic case, and Large Fragment Locking Instrument Set (103.532).

Compact Air Drive II Accessories

511.701	Compact Air Drive II
511.771	Torque Limiter, 4 Nm, for Compact Air Drive and Power Drive
511.791	Quick Coupling for Kirschner Wires Ø 0.6 to 3.2 mm, for Compact Air Drive and Power Drive
511.750	AO/ASIF Quick Coupling, for Compact Air Drive and Power Drive

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

