LeiLOX **CCWO**

Advantages of CCWO

Straightforward technique through linear cuts. Suitable for juvenile patients as the procedure is carried out outside the growth zone. Moreover, it is suitable for patients with steep TPAs that would be too challenging to treat with other techniques.

Multiaxial Locking

The screws can be locked in a 90° angle with a 12° deviation in any direction. This allows screws to be angled away from vital structures, providing greater flexibility in fixation. The robust LeiStar screw head can be locked firmly into the plate.

Anatomically Shaped Limited Contact Dynamic Compression Plates

The LeiLOX CCWO plates are contoured to match the natural shape of the bone. It simplifies placement of the plate in an optimal position and provides high stability.

The plate features limited contact dynamic compression to minimize vascular damage to the plated bone segment, promoting better blood flow and faster healing.

Titanium for Best Biocompatibility

LeiLOX CCWO implants are made of medical grade Titanium, offering several key advantages: it is biocompatible, ensuring it is well-tolerated by the body and reducing the risk of adverse reactions; it provides strength and durability, offering robust support during the bone healing process and ensuring long-term stability; and it is resistant to corrosion, making it suitable for long-term implantation and maintaining its integrity over time.

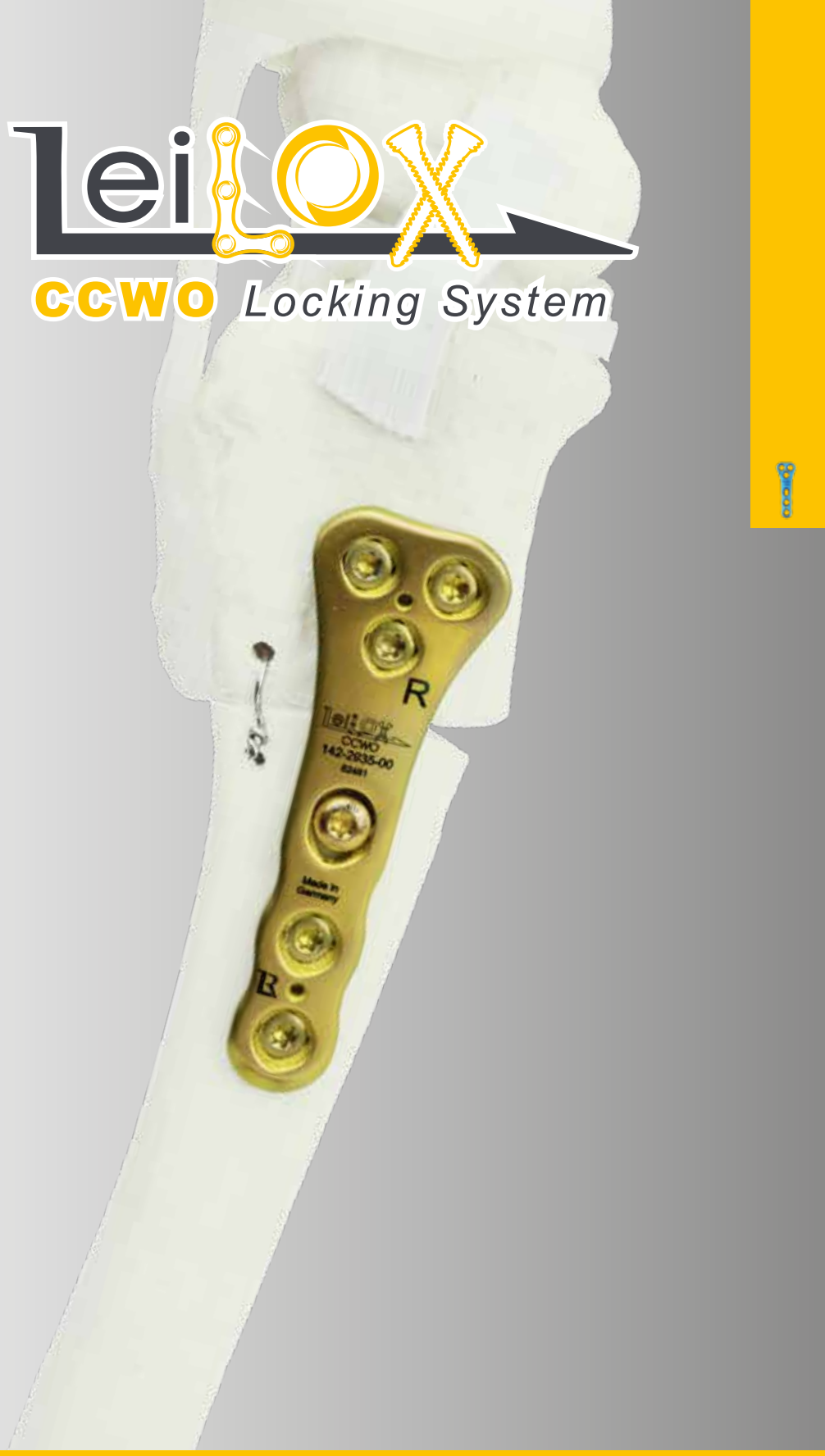
Interchangeable 2.7 & 3.5mm and 2.0 & 2.4mm Screws

Because the screwheads are identical, all Titanium 2.7/3.5 LeiLOX plates (TPLO Swing, CBLO, and CCWO systems) work with 2.7mm as well as 3.5mm screws in all of the plate sizes. Same applies for the 2.0/2.4 systems. This offers flexibility and ideal implant selection for each patient. Moreover, this saves on inventory cost.

High Performance Sawblades are available. The Titanium Nitrate coating allows them to last significantly longer than standard blades.

LeiLOX

CCWO Locking System



LeiLOX **CCWO**

RITA LEIBINGER MEDICAL

LEILOX CCWO TECHNIQUE

Pre-Operative Planning

Positioning the Patient for Radiographs

Proper positioning is essential for accurate planning. By ensuring proper positioning of the limb, accurate radiographs with consistent appearance of anatomic landmarks can be obtained for CCWO (Cranial Closing Wedge Ostectomy) pre-operative planning, allowing for precise measurements.

To obtain lateral radiographic views of the stifle joint and tibia, the patient is positioned in lateral recumbency on a radiographic table, with the stifle and tarsus positioned at 90°. The patient is best sedated to ensure optimal positioning. Orthogonal radiographs are taken with the beam centered over the stifle joint.

It is important to know that any internal or external rotation of the tibia can affect how the tibial plateau appears on the X-ray. This rotation can occur due to incorrect positioning of the affected limb or not centering the X-ray beam accurately over the stifle joint.

Determining the Tibial Plateau Angle (TPA)

Draw the functional axis (FA), also known as the weight bearing axis or mechanical tibial axis. Draw a line from the intercondylar eminence or tibial eminence proximally to the center of the tarsal joint or talocrural joint distally.

Draw the tibial plateau line (TP). To check correctness of the tibial plateau line, the cranial and caudal points of this line should be equally distant from the intercondylar eminence.

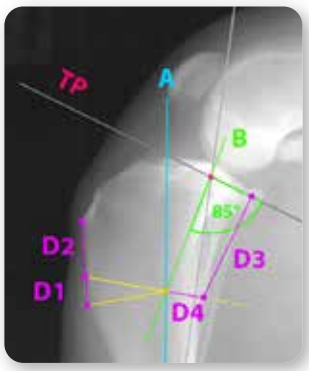
Draw a line perpendicular to the FA, where it intersects with the TP. The **TPA** is the angle between this line and TP.

There are several CCWO Techniques in achieving the target TPA. The following procedure aims for a post-operative TPA of 5°.

Draw the Mid-Diaphyseal Line (A)

The proximal mid-diaphyseal line bisects the marrow cavity at the distal extent of the tibial crest and 1-2 cm below; it generally exits the joint line at Gerdy's tubercle. To help visualize the anatomic tibia axis, see image of an intramedullary pin at the left.

Determining Wedge Size and Position



Draw a proximal axis line (**B**) from the intersection point of TP and FA at an angle of 85°, intersecting it with the mid-diaphyseal line (**A**). The intersection point of these two lines is the **CORA**.

Angle **β** is the correction angle. Next, the proximal wedge line is drawn from the cranial to the caudal cortex through the CORA. The distal wedge line is drawn from the CORA at the correction angle **β** to the cranial cortex.

Note down the following measurements:
D1 - from the insertion point of the patellar tendon to the cranial exit point of the proximal osteotomy
D2 - distance between exit points of the cranial proximal and distal osteotomies
D3 - from the caudal cortex to the caudal end of the tibia
D4 - from the CORA to the caudal cortex

Surgery Protocol

Positioning of the Patient

The dog is placed in a dorsal recumbency with the affected limb suspended from a stand. Make sure that the dog's paws are not fixed too tightly, since the affected limb will be put against the table later in the surgery. CCWO is performed through a medial skin incision.

Use of a Jig

The use of a jig is advised when performing a CCWO.

Placement of the Jig

1. The joint surface is marked with a needle. About 3 to 4 mm below is the insertion point of the proximal pin for the TPLO Jig.
2. The proximal pin is inserted in a 90° angle to the joint surface.
3. The distal pin is placed. Take care to not tilt the jig. The pins must be parallel to each other, and absolutely perpendicular to the jig.

LEILOX CCWO TECHNIQUE



Making the Osteotomy

1. With the measurements D1, D2, D3, and D4 determined during pre-op planning, mark the angle for the wedge cut. Use a wedge osteotomy gauge if needed. The cutting line can be outlined using an electrocautery device.
2. Holes for the cerclage proximal and distal to the wedge may already be made before the osteotomy.
3. Using a sagittal saw, perform the osteotomy, making sure that the cut aligns with the pins.
4. The wedge is removed and the proximal bone fragment is rotated to close the wedge. A cerclage may be placed to close the osteotomy. Ensure that the bone fragments do not move relative to each other.
5. If necessary, place a holding pin, or fix the plate straight away.


Placement of the CCWO Plate

Place the CCWO Plate, securing it in place with K-Wires.
The screws are inserted in the following (recommended) sequence:

1

Prepare the hole in the bone for the cortical screw. Use the drill guide in compression position. Insert the ***cortical screw*** 1 into the compression hole. Do not tighten yet.

TIP: Use a depth gauge to determine the required length of the screws and add about 2-3mm to the measure.

2 3 4

Drill the holes with the matching locking drill guide and insert ***locking screws*** 2, 3, and 4 one by one. Fully tighten the screws.

The locking mechanism of the LeiLOX CCWO plate is designed to be multi-axial. If there is a risk of the screws ending in the joint when drilling in a 90° angle, simply adjust the angle of the drill guide to face distally.

NOTE: We recommend that the jig be removed only when at least 2 screws have already been fixed into the plate.

IMPORTANT: Remove the stabilizing pin and positioning pin before compression (next step)

1

Tighten compression screw 1 in the compression hole to reduce the osteotomy.

5 6

Insert remaining ***locking screws*** 5 and 6 and tighten.

Check the tightness of all screws. Close the wound using standard techniques. It is crucial to properly close the periosteum and soft tissue layers to safeguard the plate site. Ensure not to overlook the closure of incision made for the distal jig pin.

Author: ***Dr. Hugo Schmökel****, DVM, PhD, Dipl. ECVS, MRCVS*

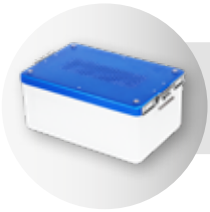
2.0 / 2.4 CCWO Set

Contains:
1 CCWO Implants and
Instruments Tray with Lid
2 of each CCWO Locking Plate
3 of each Cortical Screw
(2.0, 8-18mm // 2.4, 8-22mm, 42 total)
5 of each Locking Screw
(2.0, 6-24mm // 2.4, 6-30mm, 115 total)
2 Drills (1.5 & 1.8mm)
5 K-Wires
2x2 Locking Drill Guides
2 Compression Drill Guides
1 TPLO Jig
1 Screwdriver Handle
1 Screwdriver Shaft T8
1 Depth Gauge

142-2920-24

Tray without contents

142-2900-10



Sterilization Container
See Sterilization Containers for Implants and Instruments Trays on **Page 204.**

2.0 / 2.4 LeiLOX CCWO Locking Plates Titanium

LeiLOX CCWO Locking Plate
2.0 mm, left, 33 mm, Titanium

142-2920-10

LeiLOX CCWO Locking Plate
2.0 mm, right, 33 mm, Titanium

142-2920-00

LeiLOX CCWO Locking Plate
2.4 mm, left, 37 mm, Titanium

142-2924-10

LeiLOX CCWO Locking Plate
2.4 mm, right, 37 mm, Titanium

142-2924-00

CCWO Screws Locking & Non-Locking 2.0/2.4 Titanium

2.0 / 2.4 LeiLOX Locking Screw Titanium

For LeiLOX Locking Systems, LeiStar T8
self-holding (T8 Shaft from Rita Leibinger recommended)
self-tapping with three flute cutting edge

	2.0 mm	2.4 mm
Length (mm)	Product Code	Product Code
06	242-220-06	242-224-06
08	242-220-08	242-224-08
10	242-220-10	242-224-10
12	242-220-12	242-224-12
14	242-220-14	242-224-14
16	242-220-16	242-224-16
18	242-220-18	242-224-18
20	242-220-20	242-224-20
22	242-220-22	242-224-22
24	242-220-24	242-224-24
26	242-220-26	242-224-26
28	242-220-28	242-224-28
30	242-220-30	242-224-30
32		242-224-32
34		242-224-34
36		242-224-36
38		242-224-38
40		242-224-40

See more screw lengths on **Page 126.**

Screw Racks on **Page 198.**

2.0 / 2.4 Cortical Screw (Non-Locking) Titanium

LeiStar T8, Non-Locking
self-holding (T8 Shaft from Rita Leibinger recommended)
self-tapping with three flute cutting edge

	2.0 mm	2.4 mm
Length (mm)	Product Code	Product Code
08	245-520-08	245-524-08
10	245-520-10	245-524-10
12	245-520-12	245-524-12
14	245-520-14	245-524-14
16	245-520-16	245-524-16
18	245-520-18	245-524-18
20		245-524-20
22		245-524-22

ccwo.leibinger.vet

2.7 / 3.5 CCWO Set

Contains:
1 CCWO Implant Tray with Lid
2 of each CCWO Plate
(2.7, 3.5, 3.5 broad)
3 of each Cortical Screw
(16-34mm, 60 total)
5 of each Locking Screw
(16-46mm, 160 total)

142-2927-35

Tray without contents

142-2900-20

2.7 / 3.5 LeiLOX CCWO Locking Plates Titanium

LeiLOX CCWO Locking Plate
2.7 mm, left, 44 mm, Titanium

142-2927-10

LeiLOX CCWO Locking Plate
2.7 mm, right, 44 mm, Titanium

142-2927-00

LeiLOX CCWO Locking Plate
3.5 mm, left, 63 mm, Titanium

142-2935-10

LeiLOX CCWO Locking Plate
3.5 mm, right, 63 mm, Titanium

142-2935-00

LeiLOX CCWO Locking Plate
3.5 mm, left, 74 mm, Titanium

142-2935-60

LeiLOX CCWO Locking Plate
3.5 mm, right, 74 mm, Titanium

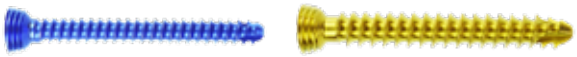
142-2935-50

CCWO Screws Locking & Non-Locking 2.7/3.5 Titanium

2.7 / 3.5 LeiLOX Locking Screw Titanium

For LeiLOX Locking Systems, LeiStar T10
self-holding (T10 Shaft from Rita Leibinger recommended)
self-tapping with three flute cutting edge

STAR Screw-Head



	2.7 mm	3.5 mm
Length (mm)	Product Code	Product Code
10	242-227-10	242-235-10
12	242-227-12	242-235-12
14	242-227-14	242-235-14
16	242-227-16	242-235-16
18	242-227-18	242-235-18
20	242-227-20	242-235-20
22	242-227-22	242-235-22
24	242-227-24	242-235-24
26	242-227-26	242-235-26
28	242-227-28	242-235-28
30	242-227-30	242-235-30
32	242-227-32	242-235-32
34	242-227-34	242-235-34
36	242-227-36	242-235-36
38	242-227-38	242-235-38
40	242-227-40	242-235-40
42	242-227-42	242-235-42
44	242-227-44	242-235-44
46	242-227-46	242-235-46
48	242-227-48	242-235-48
50	242-227-50	242-235-50
52		242-235-52
54		242-235-54
56		242-235-56
58		242-235-58
60		242-235-60

See more screw lengths on **Page 126.**

2.7 / 3.5 Cortical Screw Titanium

LeiStar T10, Non-Locking
self-holding (T10 Shaft from Rita Leibinger recommended)
self-tapping with three flute cutting edge

STAR Screw-Head

	2.7 mm	3.5 mm
Length (mm)	Product Code	Product Code
16	245-527-16	245-535-16
18	245-527-18	245-535-18
20	245-527-20	245-535-20
22	245-527-22	245-535-22
24	245-527-24	245-535-24
26	245-527-26	245-535-26
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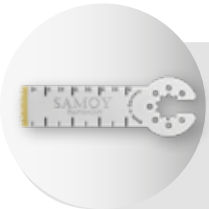
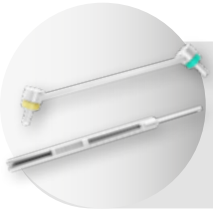
30	245-527-30	245-535-30
32	245-527-32	245-535-32
34	245-527-34	245-535-34

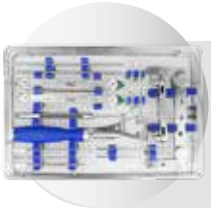


Saw Blades
See saw blades for CCWO on **Page 190.**

Screw Racks
See screw racks for 1.5mm up to 3.5mm screws on **Page 198.**



CCWO Instruments
See essential instruments for a CCWO Surgery on **Page 78.**



Instrument Set
See Instrument Set for TPLO / CBLO / CCWO on **Page 78.**